

AFFECTED ENVIRONMENT

Detailed information on resources of Big Bend National Park can be found in the GMP/EIS (NPS 2004). This section briefly describes the park and those resources potentially affected by Alternative B.

LOCATION AND GENERAL DESCRIPTION OF THE PARK

Big Bend National Park encompasses 801,000 acres in southern Brewster County in southwestern Texas. The park is in the northernmost portion of the Chihuahuan Desert, which is the largest of North America's four deserts. The name Big Bend is applied to the area that is bordered on three sides by the Rio Grande River. The park is only a part of this area. The elevation ranges from about 1,700 feet at the point where the Rio Grande leaves the park to 7,825 feet on top of Emory Peak. Big Bend National Park is known for its scenic beauty, which ranges from stark, seemingly barren wastelands to majestic forested mountains to gigantic canyons. Visitors also come to observe the flora and fauna, much of which is typical of the Chihuahuan Desert.

The RGV developed area is located in the southeast area of the park (Figure 1) and contains the park's largest campground and only RV campground. The developed area also includes a concessionaire-operated camper's store with shower and laundry facilities and an employee housing area for concessionaire and park employees. At RGV, water for human use comes from Spring 4 (Figure 2). Water from the Rio Grande River is used to water lawns and trees in the developed area.

Soils

Four soils types are present within the project area. These include Glendale-Harkey association, occasionally flooded; Tornillo loam, occasionally flooded; Lozier-Rock outcrop complex, steep; and Upton-Nickel association, undulating. Both Glendale-Harkey and Tornillo soils are associated with floodplains and alluvial fan deposits. They are deep, well-drained soils, occurring on level or gentle slopes, with slow to medium surface runoff, medium wind erosion hazard, and severe water erosion hazard. There are some limitations associated with construction activities due to high erodibility of this soil (NPS 2005).

Lozier-Rock outcrop complex consists of shallow, well-drained, moderately permeable soils over very slowly permeable bedrock. The soils formed in loamy residuum over limestone bedrock. These nearly level to very steep upland soils have slopes ranging from 0 to 60 percent. Runoff is low on slopes less than 1 percent, medium on 1 to 3 percent slopes, high on 3 to 5 percent slopes, and very high on slopes greater than 5 percent (NRCS 2006).

The Upton-Nickel association consists of soils that are shallow to deep, well-drained, and moderately permeable. Upton series formed in calcareous loamy materials, while Nickel series formed in alluvium from mixed rock sources and on fan remnants. Slopes range from 0 to 35 percent. Runoff varies from low on near-level slopes to high on greater than 8 percent slopes (NRCS 2006).

Water Resources, Including Wetland Habitat

The project area is located in the eastern part of the BBNP along the north side of the Rio Grande meander. The Rio Grande is the only perennial stream in the area with two ephemeral tributaries located in the east and west parts of the project area.

Spring 4, located in the southeastern part of the project area, currently represents the only existing source of potable water for RGV. Spring 4 drains southwest to the beaver pond, which receives flood waters from the Rio Grande and is the only natural pond in the area. These spring-fed ponds provide habitat for the Big Bend mosquitofish, which is specially adapted to the thermal qualities of the spring (NPS 2005).

The RGV developed area is underlain by Quaternary or Tertiary deposits of the Rio Grande and tributary drainages (Wilson 1983). These alluvial sediments consist of sand, gravel, and clay and may be as much 300 feet thick in the area.

The upper bedrock is composed in descending order of Boquillas, Buda, Del Rio, and Santa Elena Formations. With the exception of Del Rio shale, these rocks are predominantly cherty limestones of Cretaceous age. Where present, Del Rio shale might locally act as an impermeable barrier (Wilson 1983). The Santa Elena Formation is approximately 550 feet thick, massive bedded gray to brown, cherty fine crystalline limestone that contains numerous north-trending faults and fracture zones (ARCADIS 2005a). This formation underlies much of the study area and is therefore the most important because the faults and fractures in the limestone control the movement of groundwater and the occurrence of hot springs in the area (Cross 1984).

Deeper Cretaceous formations are represented by the Sue Peaks, Del Carmen, Telephone Canyon, and Glen Rose Formations. These rocks are primarily composed of limestones, with varying amounts of calcareous shales and marls. Shales in the basal Glen Rose likely provide a hydrologic barrier for water migration (Wilson 1983).

Generally, the hydrology of carbonate rocks is controlled by the degree and interconnection of fractures (bedding planes, faults, joints, etc). The porosity and permeability of either the fractures or the intact rock may be increased when groundwater dissolves minerals (Wilson 1983). Previous studies suggest that deep circulation of water in fractured bedrock is responsible for the thermal nature of the spring water. The most plausible model suggests that water circulates to the base of the Cretaceous carbonates, is heated by geothermal gradient, rises along faults, and ultimately discharges along the fracture intersections (Wilson 1983).

Water quality for drinking water supply must comply with maximum contaminant levels (MCLs) for inorganic, organic, and radionuclide contaminants. There are also secondary maximum contaminant levels (SMCLs) which address aesthetic concerns such as water taste. Though TCEQ MCLs are the same as those imposed by the EPA, some of the TCEQ SMCLs are higher than those imposed by the EPA. The TCEQ has been given regulating authority by the EPA; therefore, TCEQ secondary standards are used as the regulatory guideline.

A water sample from Test Well 2 (Figure 2) collected in the upper part of the alluvium provided a snapshot of water quality in this formation. Concentrations of chloride, sulfate, and TDS were detected at 400, 900 and 1,900 milligrams per liter (mg/L) and exceeded the TCEQ SMCLs of 300, 300, and 1,000 mg/L, respectively. Hardness was measured at 1,100 mg/L, significantly above the 180 mg/L threshold; and manganese was detected at 2.9 mg/L, exceeding the TCEQ SMCL standard of 0.5 mg/L. Additionally, the microscopic particulate analysis (MPA) study results indicated the presence of algae, rotifers, pollen, and a small amount of amorphous debris, all of which present a moderate risk of influence from surface water per EPA Consensus Method for Determining Groundwater Under the Influence of Surface Water Using MPA (ARCADIS 2004).

Water quality from deeper aquifers has been characterized by sampling spring/well locations. These include the Santa Elena well, Gambusia well, and Spring 4 (Figure 2). Sulfate concentrations in all water analyses were consistently around 350 mg/L, exceeding the TCEQ SMCL of 300 mg/L; and fluoride was found to be above TCEQ SMCL of 2.0 mg/L but below MCL of 4.0 mg/L in Santa Elena and Gambusia well samples. All TDS levels were below the TCEQ SMCL (ARCADIS 2005b).

Wetlands at the park have not been inventoried, and there is no wetlands map. There is, however, a map of springs (NPS 2004). Farm development destroyed Big Bend's most extensive wetlands at RGV before establishment of the park. These wetlands were created by four warm springs emanating within 0.5 mile of the Rio Grande near what is now the RGV. Pre-park agricultural development resulted in containment of springs, diversion into irrigation systems, and virtual removal of beaver populations. When RGV campground, roads, and maintenance facilities were established, they were placed in areas cleared by decades of agricultural use (NPS 2004).

Five decades of protection have allowed some natural establishment of wetlands in the area. In 1998, wetland habitat was restored along the service road at the eastern end of the RGV developed area. The project consisted of removing 350 meters of paved road from the wetland and realigning a power line outside the wetland.

Several ponds and an 80-foot-long stretch of potential wetland are located east of the RGV campground. A wetland exists near Spring 1 and the Gambusia well, on the north side of the existing paved service road. Another potential wetland area exists where the existing gravel road meets the paved service road in the southeast portion of the project area (Figure 2).

Vegetation

In addition to wetlands, two general vegetation types occur within the project area: desert scrub and floodplain/upland riparian. On Glendale-Harkey soils, vegetation includes saltcedar (*Tamarix ramosissima*), western honey mesquite (*Prosopis glandulosa*), cottonwood (*Populus deltoides*), willow (*Salix* sp.), tree tobacco (*Nicotiana glauca*), whitebrush (*Aloysia gratissima*), Bermudagrass (*Cynodon dactylon*), common reed (*Phragmites australis*), and giant reed (*Arundo donax*).

Tornillo soils cover broad, gently sloping areas that are mostly bare except for creosotebush (*Larrea tridentata*). Some of the low, nearly level areas support pockets of grass where water stands after rains. Vegetation includes creosotebush, mesquite, lechuguilla (*Agave lechuguilla*), mariola (*Parthenium incanum*), and fourwing saltbrush (*Atriplex canescens*). The brush is scattered and much of the surface is bare. Grasses are scattered tobosa (*Pleuraphis mutica*), burrograss (*Scleropogon brevifolius*), fluffgrass (*Tridens texanus*), threeawns (*Aristida adscensionis*), and sixweeks grama (*Bouteloua barbata*) (NPS 2004).

Wildlife

The proposed project area provides habitat for species dependent on desert scrub and floodplain/upland riparian habitat types. The hills within the project area are sparsely vegetated with lechuguilla, false agave, sparse grasses, and a variety of cactus species.

Numerous bird species associated with Rio Grande riparian and wetland habitats may be found in the vicinity of the project area, including several neo-tropical migrant species. Spring migration in BBNP begins in February, increasing in pace and diversity of species through March, then reaching a peak in late April and early May. The RGV area is an important stopover for these long-distance migrants, providing ample cover, food, and water. BBNP is the destination point where some of these migrants will attempt nesting. Nesting for neo-tropical migrant species in the park begins in late April or early May. Species that may nest in the vicinity of the project area include gray hawk (*Asturina nitida*), lesser nighthawk (*Chordeiles acutipennis*), black-chinned hummingbird (*Archilochus alexandri*), ash-throated flycatcher (*Myiarchus cinerascens*), Bell's vireo (*Vireo bellii*), Lucy's warbler (*Vermivora lucciae*), yellow-breasted chat (*Icteria virens*), summer tanager (*Piranga rubra*), blue grosbeak (*Guiraca caerulea*), painted bunting (*Passerina ciris*), and Scott's oriole (*Icterus parisorum*) (NPS 2004, 2005).

Year-round resident birds generally nest earlier than migrant species, usually from April through June, although some will begin nesting in March. Resident nesting species that may occur in the vicinity of the project area include scaled quail (*Callipepla squamata*), white-winged dove (*Zenaida asiatica*), Inca dove (*Columbina inca*), greater roadrunner (*Geococcyx californianus*), ladder-backed woodpecker (*Picoides scalaris*), black phoebe (*Sayornis nigricans*), Say's phoebe (*Sayornis saya*), vermilion flycatcher (*Pyrocephalus rubinus*), verdin (*Auriparus flaviceps*), cactus wren (*Campylorhynchus brunneicapillus*), rock wren (*Salpinctes obsoletus*), black-tailed gnatcatcher (*Poliophtila melanura*), northern mockingbird (*Mimus polyglottos*), curve-billed thrasher (*Toxostoma curvirostre*), crissal thrasher (*Toxostoma crissale*), canyon towhee (*Pipilo fuscus*), black-throated sparrow (*Amphispiza bilineata*), northern cardinal (*Cardinalis cardinalis*), pyrrhuloxia (*Cardinalis sinuatus*), and house finch (*Carpodacus mexicanus*) (NPS 2004, 2005).

Native amphibians in the area include primarily those adapted to permanent water sources of the Rio Grande and area ponds and wetlands. Most abundant is the Rio Grande leopard frog (*Rana berlandieri*), while red-spotted toads (*Bufo punctatus*) represent a distant second. Couch's spadefoot (*Scaphiopus couchi*), Texas toad (*Bufo speciosus*), and Great Plains narrowmouth toads (*Gastrophyrne olivacea*) are occasionally found (NPS 2004, 2005).

A wide variety of reptiles occur in the area due to the abundance of habitat diversity and production of insects, small mammals, fishes, and invertebrates in the riparian and wetland habitat of the area. Lizards common to the area include the Southwestern earless (*Cophosaurus t. scitulus*), desert spiny (*Sceloporus magister*), canyon lizard (*Sceloporus merriami*), side-blotched lizard (*Uta stansburiana stejnegeri*), checkered whiptail (*Cnemidophorus tessellatus*), and marbled whiptail (*Cnemidophorus marmoratus*). Native turtle species associated with the Rio Grande and adjacent ponds include yellow mud turtle (*Kinosternon flavescens*), Big Bend slider (*Trachemys gaigeae*), and the spiny softshell (*Apalone spinifera*). Common snakes in the area include many that are abundant park-wide, such as the coachwhip (*Masticophis flagellum*), bullsnake (*Pituophis catenifer sayi*), western diamondback rattlesnake (*Crotalus atrox*), and black-tailed rattlesnake (*Crotalus molossus*), as well as several that are common locally associated with aquatic habitats including the blotched water snake (*Nerodia erythrogaster transversa*), ringneck snake (*Diadophis punctatus*), and checkered garter snake (*Thamnophis marcianus*) (NPS 2004, 2005).

Mammals of the area also reflect the diversity of productive local habitats. Javelina (*Tayassu tajacu*) are in great abundance, and striped skunk (*Mephitis mephitis*), hog-nosed skunk (*Conepatus mesoleucus*), black-tailed jackrabbit (*Lepus californicus*), and desert cottontail (*Sylvilagus audubonii*) are common. Mule deer (*Odocoileus hemionus*) are occasionally found in the area, and the western spotted skunk (*Spilogale gracilis*) and ringtail (*Bassariscus astutus*) are rarely-seen residents. An abundance of rodents, including yellow-faced pocket gopher (*Cratogeomys castanops*), Merriam's kangaroo rat (*Dipodomys merriami*), Ord's kangaroo rat (*Dipodomys ordii*), and the desert pocket mouse (*Chaetodipus penicillatus*) among others use the sandy soils and brushy and grassy habitats along the river. An abundant prey base supports and concentrates predacious bobcat (*Lynx rufus*), coyote (*Canis latrans*), and gray fox (*Urocyon cinereoargenteus*), along with occasional mountain lions (*Felis concolor*). Spring-fed streams and the Rio Grande River combine to support beaver (*Castor canadensis*), which have created the park's only beaver pond (NPS 2004, 2005).

Mediterranean geckos (*Hemidactylus turcicus*), an exotic animal species, have become more abundant in recent decades since discovery in the early 1970s. Non-native elegant sliders (*Trachemys scripta elegans*) have continued their invasion into habitat of the native Rio Grande slider (*Trachemys scripta*), and were discovered in the RGV beaver pond in 1998 (NPS 2005). The most significant apparent impact from an exotic animal is the result of nutria (*Myocastor coypus*) invasion, and their subsequent damage to virtually all aquatic herbaceous vegetation. Nutria are large, exotic, non-native rodents that consume aquatic vegetation (NPS 2005).

Threatened, Endangered, Candidate, and Sensitive Species

Federally Listed Species

A list of federally threatened, endangered, and candidate species for Brewster County, Texas was downloaded from the USFWS, Southwest Region's web site (USFWS 2006). This list was compared with BBNP's list of federally listed species known to occur within the park. Federally listed animal species present in BBNP are the Mexican long-nosed bat (*Leptonycteris nivalis*), black-capped vireo (*Vireo atricapilla*), and Big Bend mosquitofish. The entire wild population of the federally endangered Big Bend mosquitofish exists in only three small spring-fed ponds located in the vicinity of the RGV Campground in the southeast corner of the park: Spring 1; Spring 4; and a natural beaver pond. Spring 4 provides habitat for more than 50 percent of the Big Bend mosquitofish population and one of only two genetic reservoirs. Currently, the ponds and fish are monitored every few months on a volunteer basis, exceeding the biannual monitoring requirements under the *Big Bend Gambusia Recovery Plan* (USFWS 1984).

Federally listed plant species known from BBNP include bunched cory cactus (*Coryphantha ramillosa*), Chisos Mountain hedgehog cactus (*Echinocereus chisoensis* var. *chisoensis*), and Lloyd's Mariposa cactus (*Sclerocactus mariposensis*). None of these species are found within the project area. The USFWS was consulted about the project.

Correspondence from the USFWS stating that the EA was sufficient for facilitation of Section 7 consultation was received by the park on May 22, 2006 (Appendix B).

State-Listed Species

The TPWD responded to the scoping letter on March 30, 2006 and included a list of sensitive species potentially occurring in Brewster County (Appendix C). Among state-listed species known to occur at BBNP, only the common black hawk (a state-threatened species) is known to nest in the vicinity of the project site, although not in the project area itself. In the southwestern U.S., the common black hawk is an obligate riparian nester, dependent on mature, broadleaf trees along perennial streams, although intermittent watercourses with small impoundments may also be used. The cottonwood willow and mixed broadleaf series are common riparian communities in which the species may be found. This habitat is found in the RGV campground near the project area. Foraging habitat for the species consists of areas with shallow surface water interspersed with riffles, pools, and runs; aquatic vertebrates and reptiles form the majority of the black hawk's diet (NatureServe 2006). The greatest threats to the species in the U.S. are elimination or alteration of riparian habitat, diversion of water for irrigation and storage, diking or damming for flood control, and/or lowering of the water table from underground pumping (NatureServe 2006).

Archeological Resources

The area of potential effects (APE) to archeological resources for the project follows a linear path along the proposed powerline tie-in, surrounds Well 3 (Santa Elena Well), then follows a linear buffer on either side of the proposed water line from Well 3 along the existing service road to the existing water line. The APE also covers the area around the proposed chlorination building plus the new waterline tie-in to the existing line north of the chlorination building (Figure 2). During inspection of the APE, a small prehistoric lithic scatter was observed near Well 3 under the proposed powerline. A historic trash pile was observed near the chlorination building. Neither of these resources is considered a historic property under the NHPA and neither is eligible for listing in the NRHP (Alex 2006b).

The survey report was submitted to the State Historic Preservation Officer (SHPO) for review, and the NPS consulted with the Texas Historical Commission regarding the proposed project in a letter dated June 14, 2006 (Appendix B). The SHPO concurred in a letter received by the park on July 6, 2006 that there would be no historic properties affected and that the project may proceed as planned.

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes the potential environmental consequences associated with Alternatives A and B. The methodologies and assumptions for assessing environmental consequences are discussed, including consideration of type, context, intensity, and duration and timing of impacts; cumulative impacts; and measures to mitigate impacts. As mandated by NPS policy, resource impairment is explained and then assessed for each alternative.

METHODOLOGY

Resource Impacts

The NEPA requires consideration of context, intensity, and duration of impacts; direct or indirect impacts; cumulative impacts; and measures to mitigate for impacts. NPS policy also requires that “impairment” of resources be evaluated in all environmental documents.

Potential impacts are described in terms of type (are the effects beneficial or adverse?, direct or indirect?), context (are the effects site-specific, local, or even regional?), duration (are the effects short-term?, lasting less than 1 year or long-term, lasting more than 1 year?), timing (is the project seasonally timed to avoid adverse effects), and intensity (are the effects negligible, minor, moderate, or major?). Because definitions of intensity (negligible, minor, moderate, or major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this EA.

For all impact topics, the following definitions were applied:

- Beneficial impacts - a positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
- Adverse impacts - in the context of most resources, an adverse impact refers to a change that moves the resource away from a desired condition or detracts from its appearance or condition.
- Direct impacts - an effect that is caused by an action and occurs in the same time and place.
- Indirect impacts - an effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.
- Site-specific impacts - the action would affect areas within a park unit boundary.
- Local impacts - the action would affect areas within a park unit boundary and land adjacent (sharing a boundary) to a park unit.
- Regional impacts - the action would affect the park, land adjacent to the park, and surrounding communities.
- Because definitions of intensity (negligible, minor, moderate, or major) and duration (short-term, long-term) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this environmental assessment.

In addition to determining the environmental consequences of Alternatives A and B, NPS *Management Policies 2001* and DO-12 require analysis of potential effects to determine if actions would impair a park's resources.

The fundamental purpose of the NPS, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize adverse impacts on park resources and values to the greatest degree practicable. However, the laws do give NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS management discretion to allow certain impacts within parks, that discretion is limited by statutory requirement that the NPS must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that would otherwise be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. However, an impact would more likely constitute impairment to the extent that it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's Master Plan or GMP/EIS or other relevant NPS planning documents.

Impairment may result from NPS activities related to managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park. In this section, impairment is determined in the conclusion statement of each resource topic for each alternative.

Cumulative Impacts

The CEQ regulations (40 CFR 1508.7), which implement NEPA, require that assessment of cumulative impacts be included in the decision-making process for federal projects. A cumulative impact is an impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal), organization, or person undertakes such other actions.

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative impacts are considered for both Alternatives A and B and are presented at the end of each impact topic discussion analysis. Projects in the vicinity of the proposed project area were identified to determine potential cumulative impacts. At RGV, resources were affected by agriculture and grazing for approximately 60 to 70 years, ending when the park was established in the 1940s. These activities are not considered as part of the past actions because they ended when the park was established and the cumulative impacts analysis does not analyze actions that occurred before the establishment of BBNP. Potential projects present of future projects identified as cumulative actions included any planning or development activity that was currently being implemented or that would be implemented in the reasonably foreseeable future.

These cumulative actions are evaluated in the cumulative impact analysis in conjunction with the impacts of both alternatives to determine if they would have any additive effects on the impact topics. Because some of these cumulative actions are in the early planning stages, the evaluation of cumulative effects was based on a general description of the project. Known past, current, and reasonably foreseeable future projects and actions in the vicinity of the project area and contributing to the cumulative impacts for this project are described below.

Past and Present Projects and Actions

Park Operations

In the years following the establishment of the park land use changed to visitor use and park operations with the development of housing, roads, camping areas, irrigation, a visitor center, gas station, store, and restrooms. The existing water pipelines within the project area (Figure 2) were upgraded during a 2001 water pipeline replacement project.

Wetland Restoration

In 1998, wetland habitat was restored in the vicinity of the *Gambusia* refugium at the eastern end of the RGV developed area. The project consisted of removing 350 meters of paved road from the wetland and realigning a power line outside the wetland.

Management Ignited Prescribed Burns for 2002-2003

In 2002 and 2003, approximately 10 acres within the vicinity of the proposed project area were intentionally burned to facilitate the restoration of wetland/riparian habitat critical to the Big Bend mosquitofish. Historical land use cultivation and road development has facilitated the establishment of mesquite and other shrubs, causing diminished hydrologic flows to wetland/riparian habitat. The desired goal was to reduce the canopy of brush and mesquite by 75 to 95 percent to allow for the restoration of native grasses.

Pond Construction

The park is in the process of constructing a new pond for the purposes of securing habitat for the Big Bend mosquitofish. The constructed pond is just north of the existing Spring 4 pond and has a design similar to that of the Spring 1 pond. Water for this newly constructed pond will be supplied from Spring 4. Once completed, the pond will replace the failing Spring 4 pond that provides habitat to more than 50 percent of the Big Bend mosquitofish population and one of only two genetic reservoirs.

Future Projects and Actions

Pond and Wetland Restoration

Plans are being developed for natural contours to be restored and native vegetation reestablished on the sites of two abandoned ponds approximately 150 yards north of the new pond being constructed under consideration. The ponds were originally filled via diversion of spring water. The diversions are no longer functional. Only during rare periods of high rainfall do the ponds capture local runoff. Occasional pooling of water in the pond bottoms, interspersed with extended dry periods, result in the sites remaining barren of permanent vegetation.

A more extensive earthen berm and seasonal pond site is also being considered for restoration. It is a 0.25-mile-long, straight berm roughly paralleling the east-west service road just north of the RGV Campground. Capturing sheet flow and small drainages from adjacent hills, the berm creates a temporary pool at its lower eastern end. During most years, ponding occurs for 1 to 3 months following late summer and early fall rains. In addition to altering natural hydrological and vegetative conditions, the seasonal pond fosters immense mosquito populations that are a significant irritation to adjacent campers and local residents and are increasingly considered hazardous due to the potential of mosquito-borne diseases. The berms also prevent the development of rare cottonwood and willow groves. If natural contours are restored, soil moisture stability could support up to 8 acres of additional cottonwood and willow groves.

An interpretive component is being considered as part of this project to educate and inform visitors of wetland values and restoration processes. This interpretive component could consist of placing articles in the park newspaper, revision of the Rio Grande nature trail guide, provision of a personal services nature walk on the Rio Grande nature trail once a week during the busy season (December through March), and on-site wayside exhibits for campground users and hikers on the adjacent Rio Grande nature trail. Both user groups would have direct views of the project areas and would be directly influenced by project implementation.

Upgrade of Sewage Treatment

The current sewage treatment system serving the RGV does not meet current sewage treatment needs and requirements. Selection and implementation of an alternative, improved sewage treatment process will be planned over the next few years. Such a facility will most likely be located at or near the existing sewage disposal ponds south of the staff housing area.

Campsite Relocation

The *Big Bend Gambusia Recovery Plan* prepared for the USFWS by the Rio Grande Fishes Recovery Team identified campsites near Spring 4 as a potential source of Big Bend mosquitofish habitat contamination and called for the relocation of these campsites (USFWS 1984). The 2004 BBNP GMP/EIS established a goal of relocating some campsites and an associated access road now on the eastern edge of the campground to be farther away from Spring 4.

Campground Expansion

The GMP/EIS also calls for expanding the RV hookup sites in RGV by about 40 percent with a total of no more than 30 sites. The campground expansion being considered consists of a concession operated RV hookup area expansion. The RV hookup area is located away from the campground at a site west of the RGV store and is currently a paved lot with “slots” separated by painted stripes. The NPS would like to create landscaped space between the RV slots.

Impacts to Cultural Resources and Section 106 of the National Historic Preservation Act

In this environmental assessment/assessment of effect, impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the CEQ that implement the NEPA. These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the NHPA. In accordance with the Advisory Council on Historic Preservation’s regulations implementing Section 106 of the NHPA (36 CFR Part 800, *Protection of Historic Properties*), impacts to archeological resources were identified and evaluated by:

- Determining the area of potential effects;
- Identifying cultural resources present in the area of potential effects that were either listed or eligible to be listed in the NRHP;
- Applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the NRHP; and
- Considering ways to avoid, minimize, or mitigate adverse effects.

Under the Advisory Council’s regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected NRHP eligible cultural resources. An *adverse effect* occurs whenever an impact directly or indirectly alters any characteristics of a cultural resource that qualify it for inclusion in the NRHP such as diminishing the integrity of the resource’s location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by Alternative B that would occur later in time, be farther removed in distance, or be cumulative (36 CFR Part

800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the NRHP in any way.

The CEQ regulations and the NPS's DO-12 *Conservation, Planning, Environmental Impact Analysis, and Decision-making* (NPS 2001) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be at reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis section for archeological resources under Alternative B. The Section 106 summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based on the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

SOILS

Methodology

Impact analyses on soils were based on the previous soil surveys conducted within the project area. The thresholds of change for the intensity of an impact to soils are defined as follows:

Negligible: Soils would not be affected or the effects on soils would be below or at the lower levels of detection. Any effects on soils would be slight.

Minor: The effects on soils would be detectable. Effects on the total area of soils would be small. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely be successful.

Moderate: The effect on soil would be readily apparent and would result in a change to the soil character over a relatively wide area. Mitigation measures would be necessary to offset adverse effects and would likely be successful.

Major: The effect on soil would be readily apparent and would substantially change the character of the soils over a large area in and out of the project area. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

The thresholds of change for the duration of an impact on soils are defined as follows:

Short-term: Recovers in less than 3 years.

Long-term: Takes more than 3 years to recover.

Impacts of Alternative A

Impacts Analysis

No alternative water supply with associated facilities would be constructed under this alternative; therefore, soils within the project area would not be impacted, and current conditions would remain.

Cumulative Effects

Although other past, present, and reasonably foreseeable future actions may affect soils in the area, Alternative A would have no impacts on soils and therefore would not contribute to the effects of other actions. Consequently, there would be no cumulative impacts to soils under the no action alternative.

Conclusion

Alternative A would have no impacts on soils. Because there would be no impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park's GMP/EIS or other relevant NPS planning document, there would be no impairment of the park's soils or values under Alternative A.

Impacts of Alternative B

Impacts Analysis

All of the new water pipelines are proposed for placement underneath or adjacent to existing roads or trails to minimize surface disturbance (Figure 2). Approximately 150 feet of the proposed raw water pipeline would be outside of the road. It would run 3 to 10 feet from the north side of the paved service road before connecting to the existing raw water pipeline. At the existing culverts along this paved road, the disturbance area will expand to 26 feet on the north side of the road. This would result in approximately 0.1 acres of new disturbance. Pipelines would also have to be constructed from the existing water pipelines to the chlorination building, resulting in approximately 0.2 acres of new disturbance (Figure 2). The proposed pipeline would be constructed on Glendale-Harkey association, Lozier-Rock outcrop complex, and Upton-Nickel association soil types.

The proposed chlorination building would result in approximately 0.1 acres of new disturbance and would be constructed within Lozier-Rock outcrop soils. The new power line to the Santa Elena well would only require four new poles and would result in a total disturbance area of less than 0.01 acre within Upton-Nickel association soils.

A new gravel road along an existing trail to the chlorination building would result in approximately 0.3 acres of new disturbance (some area overlapping with disturbance from the new water pipelines) within the Lozier-Rock outcrop soils (Figure 2). No new development is proposed within Tornillo loam, occasionally flooded soils.

Suitability of soils for development in the area varies. The major limitation for development is likely presented by flooding and water erosion in the Glendale-Harkey soils type, where a section of the pipeline is proposed.

Potential impacts to soils would be primarily associated with surface disturbance during construction activities. Soil disturbance during construction would occur from vegetation clearing, grading, and excavation. Exposed soils are vulnerable to erosion during rainfall and can become suspended in stormwater runoff. However, best management practices (BMPs); such as the use of silt fences, seeding disturbed areas with native vegetation, and constructing storm drains in depressions along the new section of gravel road to allow for surface water flow; would be implemented to control erosion and sediment runoff, minimizing construction-related effects (Table 1). Use of construction equipment might cause compaction of near surface soils, resulting in increased soil impermeability and surface water runoff. To minimize the potential for compaction in the project area, heavy equipment would be kept on the road adjacent to the construction sites, and construction would not be conducted under saturated soil conditions. Impacts to soils related to construction activities would be short-term, minor, localized and adverse under this alternative.

A small area of soils would be permanently altered where the chlorination building is proposed. However, given the extent of removed soils, the long-term adverse impacts to soils would be localized and negligible.

Cumulative Effects

Cumulative impacts to soils could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting soils have included park operations, wetland restoration, prescribed burns, and pond construction. Park developments in the vicinity of the project area have also altered soils. Adverse impacts to soils have resulted from construction disturbance and compaction. Increases in impervious surfaces have caused subsequent increases in surface water runoff and erosion potential. Wetland restoration has benefited soils with the removal of pavement, allowing natural filtration and restoration of hydric soil conditions. Pond construction has also restored hydric soil conditions. Prescribed fires in the area have increased the wetland characteristics of affected soils and temporarily increased soil nutrient levels.

Future projects that would affect soils include pond and wetland restoration, campsite relocation, and campground expansion. Pond and wetland restoration would restore hydric soil conditions. Campsite relocation would also benefit soils through removal of impervious surfaces, allowing for natural soil infiltration. Expansion of the RV campground would adversely impact soils by increasing impervious surfaces and subsequently increasing surface water runoff and erosion potential.

Overall, the cumulative effects of past, present, and foreseeable future projects on soils would be minor, localized, and adverse over the short term from construction disturbance and moderate, localized, and both adverse and beneficial over the long term. Alternative B would contribute to short-term adverse impacts to soils; however, the contribution would be minor overall and would not change the intensity of cumulative effects.

Conclusion

Construction activities under Alternative B would have only short-term, minor, localized, adverse impacts on soils in the project area. A small area of soils where the chlorination building, pipeline, power poles, and new road are proposed would be permanently altered; however, long-term impacts would be minor and localized given the size of the area that would be affected. Cumulative impacts on soils from Alternative B; in conjunction with other past, present, and future activities; would be minor, localized, and adverse over the short term from construction disturbance and moderate, localized, and both adverse and beneficial over the long term. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park's GMP/EIS or other relevant NPS planning document, there would be no impairment of the park's soils resources or values under Alternative B.

WATER RESOURCES, INCLUDING WETLAND HABITAT

Methodology

Impact analysis of water resources was based on recent hydrological assessments of the site and previous projects conducted within the same area. The thresholds of change for the intensity of an impact on water resources, including wetlands are defined as follows:

Negligible: Wetlands would not be affected or the effects would be below or at the lower level of detection. Impacts (chemical, physical, or biological effects) to water quality would not be detectable, would contribute effects that would be well below water quality standards or criteria, and would be within historical or desired water quality conditions.

Minor: The effects to wetlands would be detectable and relatively small in terms of area and the nature of the change. The action would affect a limited number of individuals of plant or wildlife species within the wetland. Impacts (chemical, physical, or biological effects) to water quality would be detectable but would contribute effects that would be well below water quality standards or criteria and within historical or desired water quality conditions.

Moderate: The effects to wetlands would be readily apparent over a relatively small area but the impact could be mitigated by restoring previously degraded wetlands. The action would have a measurable effect on plant or wildlife species within the wetland, but all species would remain indefinitely viable. Impacts (chemical, physical, or biological effects) to water quality would be detectable but would contribute effects at or below water quality standards or criteria; however, historical baseline water quality conditions would be noticeably altered.

Major: The effects to wetlands would be readily apparent over a relatively large area. The action would have measurable consequences for the wetland area that could not be mitigated. Wetland species dynamics would be upset, and plant and/or animal species would be at risk of extirpation from the area. Impacts (chemical, physical, or biological effects) to water quality would be readily detectable, and would contribute effects to water quality standards or criteria; historical baseline water quality conditions would be obviously altered.

The thresholds of change for the duration of an impact on water resources are defined as follows:

Short-term: Following treatment, effects would last less than one year.

Long-term: Following treatment, effects would last longer than one year.

The thresholds of change for the duration of an impact on wetlands are defined as follows:

Short-term: Recovers in less than 3 years.

Long-term: Takes more than 3 years to recover.

Impacts of Alternative A

Impacts Analysis

Under this alternative, the direct effects on hydrology would occur as a result of diverting the portion of the flow from the Spring 4 to satisfy the water supply demand. Historically, the peak month water use for the RGV water system was 5.9 gpm and the peak 2-week flow rate was 8.5 gpm; however, water usage is lower for most of the year. Continuing diversion of a portion of the spring flow for the water supply would affect the local hydrology by reducing the flows available for local water features including the beaver

pond. Under normal conditions there appears to be adequate supply for all uses; however, water shortages may occur during peak tourist season or periods of drought. The water level in the ponds may be reduced during these times, resulting in loss or reduction of wetland/riparian habitat.

The TCEQ has expressed concerns that Spring 4 is possibly under the direct influence of surface water. The spring would not be able to meet TCEQ standards for potable water if it is under the direct influence of surface water, without filtration treatment to remove microparticulate contaminants expected in surface waters. Overall impacts to water resources, including wetland habitat, due to the potential for reduced flows and reduction in water quality under Alternative A would be long-term, localized, moderate, and adverse.

Cumulative Effects

Cumulative impacts to water resources, including wetland habitat, could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting water resources have included park operations, wetland restoration, pond construction, and prescribed fires. Park developments within the RGV developed area have adversely impacted water resources from conversion of wetland/riparian habitat to campgrounds and other facilities and diversion of spring water for human use. Wetland restoration and prescribed fires have benefited water resources in the RGV developed area. A paved road, water pipeline, and power line were removed to restore a wetland habitat, and woody vegetation in a riparian area was burned to increase hydrologic flows to wetland/riparian habitat.

Future projects that would likely affect water resources, including wetland habitat, include additional pond restoration, campsite relocation, and campground expansion. Pond restoration would benefit water resources over the long term by restoring dried ponds and providing habitat for the endangered Big Bend mosquitofish. Relocation of the campsites near Spring 4 would benefit local water quality and quantity by removing impervious surfaces and discontinuing contribution of sediments to nearby ponds. Campground expansion would increase impervious surfaces, resulting in increased stormwater runoff to nearby waters.

Overall, the cumulative effects of past, present, and future projects on water resources, including wetland habitat, in the RGV developed area would be minor, localized, and adverse over the short term from construction-related activities and localized, moderate, and both adverse and beneficial over the long term. Alternative A would contribute to long-term, localized, moderate, adverse impacts on water resources, including wetland habitat.

Conclusion

Overall impacts to water resources, including wetland habitat, due to the potential for reduced flows and reduction in water quality under Alternative A would be long-term, localized, moderate, and adverse. Cumulative effects on water resources, including wetland habitat, from Alternative A in conjunction with past, present, and future projects would be minor, localized, and adverse over the short term and localized, moderate, and both adverse and beneficial over the long term. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's GMP/EIS or other relevant NPS planning document, there would be no impairment of the park's water resources or values under Alternative A.

Impacts of Alternative B

Impact Analysis

Three test wells were completed to evaluate an alternative source for water supply in the project area (Figure 2). Test Well 1, located in the northeastern portion of the project area, was drilled to a depth of 300 feet with very little water encountered (ARCADIS 2004). Test Well 2 was located just southwest of the visitor center and was completed in the upper part of the alluvium at a depth of 90 feet. This well was able to sustain a long-term yield of 30 to 35 gpm; however the water quality was unacceptable due to excessive treatment requirements (ARCADIS 2004).

Test Well 3 was drilled to 798 feet and was completed in the Santa Elena Formation. Based on the pumping test results, this well is capable of sustaining flows of at least 15 gpm over the long term (ARCADIS 2005a); thus providing sufficient yields for RGV water supply.

Potential impacts to water resources, including wetland habitat, would be associated with surface disturbance during conversion of the Test Well 3; construction of the chlorination building, water pipelines, and roads; water withdrawals during implementation; and removal of the chlorinator at the existing springbox at Spring 4, and periodic maintenance of existing infrastructure to be used as an emergency back-up system.

A wetland exists near Spring 1 and the Gambusia well, on the north side of the existing paved service road. Another potential wetland area exists where the existing gravel road meets the paved service road in the southeast portion of the project area (Figure 2). The pipeline would avoid the wetland near Spring 1 and the Gambusia well. Another potential wetland area exists where the existing gravel road meets the paved service road in the southeast portion of the project area, northwest of the Berkley Cottage. This potential wetland area has not been delineated by the NPS Water Resources Division. Soils in this area are listed as occasionally flooded (NRCS 2006). The pipeline would be buried underneath the existing road and is not expected to disturb wetland hydrology, soils, or vegetation in this area. In addition, trench construction in this area is recommended to be conducted during the dry period (April to July) to limit the amount of trench dewatering needed for trench construction.

Surface disturbance associated with construction activities would increase the potential for erosion and sedimentation. Use of construction equipment might compact near surface soils, and would reduce the soil's ability to absorb water, which could result in an increase of surface runoff and potential for ponding. Construction disturbance would not be uniformly distributed across the project area, but instead would be concentrated near the construction sites. Effects from construction would be greatest in the short term and would decrease over time because of stabilization and reclamation efforts. Additionally, BMPs detailing the sediment and erosion control measures have been developed to prevent and mitigate any potential impacts (Table 1). The impacts during the construction activities are anticipated to be short-term, localized, negligible, and adverse. Because less than 0.1 acre of wetlands would be disturbed or degraded by this alternative, no Statement of Findings under DO-77.1 is required.

Potential impacts to water resources, including wetland habitat, from development of the Santa Elena well may include changes in groundwater quantity and alteration of flow to local springs and wetlands. It is not currently known whether pumping water from the Santa Elena aquifer over the long term would have an effect on the water levels in Spring 4. However, the Santa Elena well has been extensively pump-tested, and monitoring in test wells around Spring 4 showed no effect on the water level of the aquifer around the spring. The existing water levels would not flood the tiered ponds leading to the river. Continued monitoring of the effects of the well's use on the spring is recommended as well as modification of the use of the well if a decrease in the water levels of the surrounding natural springs was observed.

Removal of the chlorinator at the existing springbox at Spring 4 would provide a long-term, localized, moderate, and beneficial effect by reducing the possibility of contaminating surface water or groundwater with chlorine. Impacts from periodic maintenance of existing infrastructure to be used as an emergency back-up system would be similar to that of use of the existing water supply system described under Alternative A. However, adverse impacts would be less because the maintenance would be periodic and use of the existing system would only occur during an emergency.

Development of the Santa Elena well for domestic water use for the RGV developed area would have primarily beneficial impacts by alleviating demands on Spring 4 and allowing for more water to be diverted to natural habitats. Overall impacts to water resources, including wetland habitat, under Alternative B would be long-term, localized, minor, and beneficial.

Cumulative Effects

Cumulative impacts to water resources, including wetland habitat, could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting water resources have included park operations, wetland restoration, pond construction, and prescribed fires. Park developments at RGV have adversely impacted water resources from conversion of wetland/riparian habitat to campgrounds and other facilities and diversion of spring water for human use. Wetland restoration and prescribed fires have benefited water resources in the RGV developed area. A paved road, water pipeline, and power line were relocated to restore a wetland habitat, and woody vegetation in a riparian area was burned to increase hydrologic flows to wetland/riparian habitat.

Future projects that would likely affect water resources, including wetland habitat, include additional pond restoration, campsite relocation, and campground expansion. Pond restoration would benefit water resources over the long term by restoring dried ponds and providing habitat for the endangered Big Bend mosquitofish. Relocation of the campsites near Spring 4 would benefit local water quality and quantity by removing impervious surfaces and discontinuing contribution of sediments to nearby ponds. Campground expansion would increase impervious surfaces, resulting in increased stormwater runoff to nearby waters.

Overall, the cumulative effects of past, present, and future projects on water resources, including wetland habitat in the RGV developed area would be minor, localized, and adverse over the short term from construction-related activities and localized, moderate, and both adverse and beneficial over the long term. Alternative B would contribute to short-term adverse impacts and long-term beneficial impacts on water resources, including wetland habitat; however, contribution would be minor overall and would not change the intensity of overall cumulative effects.

Conclusion

Construction activities under Alternative B would have short-term, negligible, localized, adverse impacts on water quality. Removal of the chlorinator at the existing springbox at Spring 4 would provide a long-term, localized, moderate, and beneficial effect by reducing the possibility of contaminating surface water or groundwater with chlorine. Impacts from periodic maintenance of existing infrastructure to be used as an emergency back-up system would be similar to that of use of the existing water supply system described under Alternative A. However, adverse impacts would be less because the maintenance would be periodic and use of the existing system would only occur during an emergency. Development of the Santa Elena well for domestic water use for the RGV developed area would primarily have beneficial impacts by removing the chlorinator at the Spring 4 springbox and alleviating demands on Spring 4 and allowing for more water to flow to natural habitats. Overall impacts to water resources, including wetland habitat, under Alternative B would be long-term, localized, minor, and beneficial. Cumulative effects on water resources in the RGV developed area from Alternative B; in conjunction with past, present, and future projects; would be minor, localized, and adverse over the short term and localized, moderate, and both adverse and beneficial over the long term. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park's general

management plan or other relevant NPS planning document, there would be no impairment of the park's water resources or values under Alternative B.

VEGETATION

Methodology

Impact analyses on vegetation were based on observations made in the field during a site visit on April 26, 2006, previous projects conducted within the same area, and consultation with park staff.

The thresholds of change for the intensity of an impact on vegetation are defined as follows:

Negligible: No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be on a small scale, and no species of special concern would be affected.

Minor: The alternative would temporarily affect some individual native plants and would also affect a relatively minor portion of that species' population. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.

Moderate: The alternative would affect some individual native plants and would also affect a sizeable segment of the species' population over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected.

Major: The alternative would have a considerable effect on native plant populations, including species of special concern, and would affect a relatively large area in and out of the park. Mitigation measures to offset the adverse effects would be required and extensive, and success of the mitigation measures would not be guaranteed.

The thresholds of change for the duration of an impact on vegetation are defined as follows:

Short-term: Recovers in less than 3 years.

Long-term: Takes more than 3 years to recover.

Impacts of Alternative A

Impacts Analysis

No direct effects on vegetation would occur under Alternative A. However, continued diversion of a portion of the spring flow for the water supply would affect the local hydrology by reducing the flows available for local water features including the beaver pond. Indirect effects caused by water shortages may occur during peak tourist season or periods of drought. During these times, the water level in the pond may be reduced, resulting in loss or reduction of wetland/riparian vegetation. The aquatic and emergent wetland vegetation currently associated with the pond would convert to a more upland vegetation community as water levels in the pond recede and the pond eventually dries up. These indirect impacts would be long-term, localized, minor, and adverse.

Cumulative Effects

Cumulative impacts to vegetation could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting vegetation have included park operations, wetland restoration, pond construction, and prescribed fires. Park operations and developments within the RGV developed area permanently removed vegetation in some areas and altered natural vegetation communities through irrigation. Wetland restoration and prescribed fires have benefited vegetation in the RGV developed area by restoring native grasses and wetland/riparian vegetation in areas dominated by invasive mesquite.

Future projects that would likely affect vegetation include additional pond restoration, campsite relocation, and campground expansion. Pond and wetland restoration would benefit vegetation over the long term by restoring native wetland/riparian species to the area. The relocation of campsites near Spring 4 would benefit the local vegetation by restoring natural habitat and will prevent runoff from asphalt roads and vehicle fluids from being flushed into the beaver pond and Big Bend mosquitofish habitat. However, vegetation at the site of relocation would be adversely impacted by development. Expansion of the campground would likely require removal of vegetation in areas.

Overall, the cumulative effects of past, present, and future projects on vegetation would be minor, localized, and adverse over the short term and localized, moderate, and both adverse and beneficial over the long term. Alternative A would contribute to long-term adverse impacts on vegetation; however, contribution would be minor and would not change the intensity of overall cumulative effects.

Conclusion

Long-term, localized, minor, adverse impacts on vegetation would occur under Alternative A from the possible loss or reduction of wetland/riparian vegetation. Cumulative impacts on vegetation from Alternative A; in conjunction with other past, present, and future activities; would be minor, localized, and adverse over the short term and localized, moderate, and both beneficial and adverse over the long term. Because there would be no major, adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park's GMP/EIS or other relevant NPS planning document, there would be no impairment of the park's vegetation or values under Alternative A.

Impacts of Alternative B

Impact Analysis

Construction activities under Alternative B would have short-term, negligible, localized, adverse impacts on vegetation within the area of disturbance.

All of the new water pipelines are proposed for placement underneath or adjacent to existing roads or trails to minimize the surface disturbance (Figure 2). Approximately 150 feet of the proposed raw water pipeline would be outside of the road. It would run 3 to 10 feet from the north side of the paved service road before connecting to the existing raw water pipeline. At the existing culverts along this paved road, the disturbance area will expand to 26 feet on the north side of the road. This would result in approximately 0.1 acres of new disturbance. This disturbance would occur in the floodplain/upland riparian vegetation community.

Pipelines would also have to be constructed from the existing water pipelines to the chlorination building, resulting in approximately 0.2 acres of new disturbance (Figure 2). The proposed chlorination building would result in approximately 0.1 acre of new disturbance. The new power line to the Santa Elena well would only require four new poles and would result in a total disturbance area of less than 0.01 acre. All of this disturbance would occur in the desert scrub vegetation community.

A new gravel road, along an existing trail to the chlorination building, will result in approximately 0.3 acre of new disturbance (Figure 2). Woody vegetation and some native grasses would have to be cleared. However, all disturbed areas would be restored with native grasses after construction is complete, minimizing long-term impacts. This disturbance would also occur in the desert scrub vegetation community.

Under Alternative B, no diversion of the Spring 4 water supply would be necessary. The water level in the pond would not be expected to be reduced, resulting in no loss or reduction of wetland/riparian vegetation. Therefore, indirect impacts to vegetation under Alternative B would be long-term, localized, minor, and beneficial.

Cumulative Effects

Cumulative impacts to vegetation could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting vegetation have included park operations, wetland restoration, pond construction, and prescribed fires. Park operations and developments within the RGV developed area permanently removed vegetation in some areas and altered natural vegetation communities through irrigation. Wetland restoration and prescribed fires have benefited vegetation in the RGV developed area by restoring native grasses and wetland/riparian vegetation in areas dominated by invasive mesquite.

Future projects that would likely affect vegetation include additional pond restoration, campsite relocation, and campground expansion. Pond and wetland restoration would benefit vegetation over the long term by restoring native wetland/riparian species to the area. The relocation of campsites near Spring 4 would benefit the local vegetation by restoring natural habitat. However, vegetation at the site of relocation would be adversely impacted by development. Expansion of the campground would likely require removal of vegetation in areas.

Overall, the cumulative effects of past, present, and future projects on vegetation would be minor, localized, and adverse over the short term and localized, moderate, and both adverse and beneficial over the long term. Alternative B would contribute to long-term adverse and beneficial impacts and short term adverse impacts on vegetation; however, the overall contribution would be minor and would not change the intensity of overall cumulative effects.

Conclusion

Long-term, localized, minor, beneficial impacts on vegetation would occur under Alternative B by reducing the potential of loss or reduction of wetland/riparian vegetation in Spring 4. Short-term, localized, negligible, adverse impacts would occur from construction activities. Cumulative impacts on vegetation from Alternative B, in conjunction with other past, present, and future activities, would be minor, localized, and adverse over the short term and localized, moderate, and both beneficial and adverse over the long term. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park's GMP/EIS or other relevant NPS planning document, there would be no impairment of the park's vegetation or values under Alternative B.

WILDLIFE

Methodology

This impact analysis focuses on wildlife groups, species, and habitats that were considered most likely to be affected by the project. Information on wildlife habitats and species potentially present was derived from observations made in the field during a site visit on April 26, 2006, previous projects conducted within the same area, geographic information system (GIS) coverage for the area, and consultation with park staff. The impact analysis focuses on the potential changes to wildlife habitats and use of the project area that may occur as a result of project implementation.

The thresholds of change for the intensity of an impact on wildlife are defined as follows:

Negligible: Wildlife would not be affected or the effects would be at or below the level of detection and the changes would be so slight that they would not be of any measurable or perceptible consequence to the species' population. There would be no observable or measurable impacts to native fish and wildlife species, their habitats, or the natural processes sustaining them. Impacts would be well within the range of natural fluctuations.

Minor: Effects to wildlife would be detectable, although localized, small, and of little consequence to the species' population. Impacts would be detectable, but they would not be expected to be outside the natural range of variability and would not be expected to have any effects on native species, their habitats, or the natural processes sustaining them. Small changes to population numbers, population structure, genetic variability, and other demographic factors for species may occur, but overall these characteristics remain stable and viable. Occasional responses to disturbance by some individuals could be expected, but without interference to feeding, reproduction, or other factors affecting population levels. Key ecosystem processes may have disruptions that would be within natural variation. Sufficient habitat would remain functional to maintain viability of all species. Impacts would be outside of critical reproduction periods for sensitive species.

Moderate: Effects to wildlife would be readily detectable and localized, with consequences at the population level. Mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the park unit. Impacts to native fish and wildlife species, their habitats, or the natural processes sustaining them would be detectable, and they could be outside the natural range of variability. Changes to population numbers, population structure, genetic variability, and other demographic factors for species may occur, but would be expected to rebound to pre-impact numbers and to remain stable and viable. Frequent response to disturbance by some individuals could be expected, with some negative impacts to feeding, reproduction, or other factors affecting population levels. Key ecosystem processes might have disruptions that would be outside natural variation (but would return to natural conditions). Sufficient habitat would remain functional to maintain variability of all native fish and wildlife species. Some impacts might occur during critical periods of reproduction or in key habitat for sensitive native species.

Major: Effects to wildlife would be obvious and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed. Impacts on native fish and wildlife species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability. Population numbers, population structure, genetic variability, and other demographic factors for species might have large declines with population numbers significantly depressed. Frequent responses to disturbance by some individuals would be expected, with negative impacts to feeding, reproduction, or other factors resulting in a decrease in population levels. Breeding colonies of native species might relocate to other portions of the recreation area. Key ecosystem processes might be permanently disrupted. Loss of habitat may affect the viability of at least some native species.

The thresholds of change for the duration of an impact on wildlife are defined as follows:

Short-term: Following treatment, recovery will take less than 1 year.

Long-term: Following treatment, recovery will take longer than 1 year.

Impacts of Alternative A

Impacts Analysis

Under Alternative A, no direct effects on wildlife would occur. However, indirect effects could occur to the Spring 4 pond if diversion of a portion of the spring flow for water supply continues, resulting in the loss or reduction of the associated aquatic and wetland habitat during periods of drought. Loss of this habitat would likely decrease the suitability of habitat for several species; including some birds, reptiles, amphibians, and small mammals; within the project area over the long term and potentially result in a decrease in these species in the area. Reptiles, amphibians, and small mammals dependent on this habitat type are prey species for many larger animals and birds. A decrease in this habitat type would subsequently decrease the availability of these prey species in the project area. Overall impacts to wildlife under Alternative A would be long-term, localized, minor, and adverse.

Cumulative Effects

Cumulative impacts to wildlife could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting wildlife have included park operations, wetland restoration, pond construction, and prescribed fires. Park operations and developments within the RGV developed area increased area disturbance to wildlife and permanently removed wildlife habitat in portions of the area. Wetland restoration helped to restore wetland habitat which beneficially affected wetland-dependent species. Although low-intensity prescribed burning likely degraded wildlife habitat over the period immediately following the burns, this action aims at improving habitat conditions over the long term by restoring native grasses and sensitive wetland/riparian habitat.

Future projects that would likely affect vegetation include additional pond restoration, campsite relocation, and campground expansion. Construction activities associated with these projects would likely result in short-term, localized, minor, adverse impacts on wildlife. Over the longer term, wildlife habitat would benefit by pond restoration, which would improve hydrological and vegetative conditions and allow for additional cottonwood and willow habitat development. Campground relocation would have both beneficial and adverse effects on wildlife over the long term by eliminating habitat and increasing disturbance at the relocation site, but restoring habitat and reducing disturbance in the existing campground area. Campground expansion would have long-term, minor, localized, adverse effects on wildlife and habitat by eliminating habitat and increasing the amount of human disturbance in the area.

Overall, the cumulative effects of past, present, and future projects on wildlife would be minor, localized, and adverse over the short term and localized, minor, and both adverse and beneficial over the long term. Cumulative impacts to wildlife from Alternative A, in conjunction with these other past, present, and future activities, would be minor, localized, and adverse over the short term, and localized, minor, and both beneficial and adverse over the long term. Alternative A would contribute a small amount to adverse cumulative impacts to wildlife.

Conclusion

Long-term, localized, minor, adverse impacts on wildlife would occur under Alternative A if diversion of a portion of the spring flow for water supply continues, resulting in the loss or reduction of the associated aquatic and wetland habitat. Cumulative impacts to wildlife from Alternative A, in conjunction with these other past, present, and future activities, would be minor, localized, and adverse over the short term and localized, minor, and both beneficial and adverse over the long term. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park's GMP/EIS or other relevant NPS planning document, there would be no impairment of the park's wildlife resources or values under Alternative A.

Impacts of Alternative B

Impact Analysis

Construction activities would have only short-term, negligible to minor, localized, adverse impacts on wildlife in the vicinity of the project area. The project area has been previously affected through years of visitation; any wildlife in the area have likely been long habituated to human activity and noise. Larger wildlife, including birds, would likely avoid the construction area to a certain extent during construction due to increased activity. However, some small animals may be injured, killed, or forced to relocate to areas outside the construction zone during construction activities. Nest sites are not likely to be affected by construction activities because only a small amount of woody vegetation suitable for nesting would be removed within the project area. Overall, populations of affected species might be negligibly and temporarily lowered during construction, but no permanent negative effects on wildlife would be anticipated.

All of the new water pipelines are proposed for placement underneath or adjacent to existing roads or trails to minimize the surface disturbance (Figure 2). Approximately 150 feet of the proposed raw water pipeline would be outside of the road. It would run 3 to 10 feet from the north side of the paved service road before connecting to the existing raw water pipeline. At the existing culverts along this paved road, the disturbance area will expand to 26 feet on the north side of the road. This would result in approximately 0.1 acres of new disturbance. Pipelines would also have to be constructed from the existing water pipelines to the chlorination building, resulting in approximately 0.2 acres of new disturbance (Figure 2).

The proposed chlorination building would result in approximately 0.1 acre of new disturbance. The new power line to the Santa Elena well would only require four new poles and would result in a total disturbance area of less than 0.01 acre.

A new gravel road along an existing trail to the chlorination building, will result in approximately 0.3 acre of new disturbance (Figure 2). Woody vegetation and some native grasses would have to be cleared. This habitat conversion would adversely affect species, particularly birds, which depend on shrubs and woody vegetation for perching, nesting, and foraging. However, this adverse effect would be negligible in intensity, given the very small area affected and the many acres of suitable vegetated habitat surrounding the project area that would remain unaffected by project implementation. Overall, long-term effects of habitat on wildlife species would be localized and negligible to minor in intensity.

Under Alternative B, no diversion of the Spring 4 water supply would be necessary. The water level in the pond would not be expected to be reduced, resulting in no loss or reduction of wetland/riparian vegetation. The suitability of habitat for several species, including some birds, reptiles, amphibians, and small mammals would be maintained. Therefore, indirect impacts to wildlife under Alternative B would be long-term, localized, minor, and beneficial.

Cumulative Effects

Cumulative impacts to wildlife could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting wildlife have included park operations, wetland restoration, pond construction, and prescribed fires. Park operations and developments within the RGV developed area increased area disturbance to wildlife and permanently removed wildlife habitat in portions of the area. Wetland restoration helped to restore wetland habitat in the vicinity, which beneficially affected wetland-dependent species. Although low-intensity prescribed burning likely degraded wildlife habitat over the period immediately following the burns, this action aims at improving habitat conditions by restoring native grasses and sensitive wetland/riparian habitat.

Future projects that would likely affect vegetation include additional pond restoration, campsite relocation, and campground expansion. Construction activities associated with these projects would likely result in short-term, localized, minor, adverse impacts on wildlife. Over the longer term, wildlife habitat would be benefited by pond restoration, which would improve hydrological and vegetative conditions and allow for additional cottonwood and willow habitat development. Campground relocation would have both beneficial and adverse effects on wildlife over the long term by eliminating habitat and increasing disturbance at the relocation site, but restoring habitat and reducing disturbance in the existing campground area. Campground expansion would have long-term, minor, localized, adverse effects on wildlife and habitat by eliminating habitat and increasing the amount of human disturbance in the area.

Overall, the cumulative effects of past, present, and future projects on wildlife would be minor, localized, and adverse over the short term and localized, minor, and both adverse and beneficial over the long term. Cumulative impacts on wildlife from Alternative B, in conjunction with these other past, present, and future activities, would be minor, localized, and adverse over the short term and localized, minor, and both beneficial and adverse over the long term. Alternative B would contribute a small amount to adverse cumulative impacts on wildlife.

Conclusion

Construction activities under Alternative B would have only short-term, negligible to minor, localized, adverse impacts on wildlife in the vicinity of the project area. Long-term, localized, minor, beneficial impacts on wildlife would occur under Alternative B by reducing the potential of loss or reduction of wetland/riparian habitat in Spring 4. Cumulative impacts on wildlife from Alternative B, in conjunction with other past, present, and future activities, would be minor, localized, and adverse over the short term and localized, minor, and both beneficial and adverse over the long term. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park's general management plan or other relevant NPS planning document, there would be no impairment of the park's wildlife resources or values under Alternative B.

THREATENED, ENDANGERED, CANDIDATE, AND SENSITIVE SPECIES

Methodology

This impact analysis identified federally listed, candidate species, and state-listed species that could be affected by project implementation and analyzed impacts on those affected species. A list of federally threatened, endangered, and candidate species for Brewster County, Texas was downloaded from the USFWS, Southwest Region's web site (USFWS 2006). This list was compared with BBNP's list of federally listed species known to occur within the park. The USFWS was informed of the proposed project in a letter dated February 7, 2006. The USFWS advised the NPS that the biological assessment could be incorporated into the EA to facilitate Section 7 consultation (Skiles 2006). State-listed species and species of concern that could be affected by project implementation were identified through consultation with the

park's biologist. The project area was compared with known listed and sensitive species distribution records and habitat types in order to assess potential impacts.

The thresholds of change for the intensity of an impact on threatened, endangered, and sensitive species are defined as follows:

Negligible: An action that would not affect any individuals of a listed or sensitive species or their habitat within the park. No federally listed species would be affected; or the alternative would affect an individual of a listed species or its critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence to the protected individual or its population. Any impact would be site-specific. A negligible effect would equate with a "no effect" determination in USFWS terms.

Minor: An action that would affect a few individuals of sensitive species or have highly localized impacts upon their habitat within the park. The change would require considerable scientific effort to measure and have barely perceptible consequences to the species or habitat function. The alternative would affect an individual(s) of a listed species or its critical habitat, but the change would be small. A minor effect would equate with a "may effect" determination in USFWS terms, and would be accompanied by a statement of "not likely to adversely affect" the species.

Moderate: An action that would cause measurable effects on: (1) a relatively moderate number of individuals within a sensitive species population, (2) the existing dynamics among multiple species (e.g., predator-prey, herbivore-forage, vegetation structure-wildlife breeding habitat), or (3) a relatively large habitat area or important habitat attributes within the park. A sensitive species population or habitat might deviate from normal levels under existing conditions, but would remain indefinitely viable within the park. An individual or population of a listed species or its critical habitat would be noticeably affected. The effect could have some consequence to the individual, population, or habitat. Mortality or interference with activities necessary for survival are expected on an occasional basis, but are not expected to threaten the continued existence of the listed species in the park. A moderate effect would equate with a "may effect" determination in USFWS terms and would be accompanied by a statement of "not likely to adversely affect" the species. State species of concern could also be affected.

Major: An action that would have drastic and permanent consequences for a sensitive species population, dynamics among multiple species, or almost all available critical or unique habitat area within the park. A sensitive species population or its habitat would be permanently altered from normal levels under existing conditions, and the species would be at risk of extirpation from the park. An individual or population of a listed species, or its critical habitat, would be noticeably affected with a vital consequence to the individual, population, or habitat. Mortality or other effects are expected on a regular basis and could threaten continued survival of the species in the park. A major effect would equate with a "likely to adversely affect" determination in USFWS terms. A "take" under Section 7 of the ESA could occur.

The thresholds of change for the duration of an impact on threatened, endangered, and sensitive species are defined as follows:

Short-term: Recovery will take less than 1 year.

Long-term: Recovery will take longer than 1 year.

Impacts of Alternative A

Impact Analysis

Federally Listed Species

The Big Bend mosquitofish is the only federally listed species likely to be affected by Alternative A. The Spring 4 pond provides habitat for more than 50 percent of the Big Bend mosquitofish population and one of only two genetic reservoirs. Continued use of the Spring 4 hot spring for potable water could decrease available flows for this endangered fish species, especially during periods of drought or during a water system leak. A new pond is currently under construction north of the existing Spring 4 pond that will use the Spring 4 water source to supply additional habitat to the Big Bend mosquitofish. Current management practices would continue to supply water for the Big Bend mosquitofish and would continue to meet the conservation and recovery objectives for the species outlined in the *Big Bend Gambusia Recovery Plan* (USFWS 1984). However, under current management practices, the Big Bend mosquitofish would not accrue the benefits of greater available water supply proposed under Alternative B. Therefore, Alternative A “may affect, is not likely to adversely affect” the federally endangered Big Bend mosquitofish and its habitat in the park.

State-Listed Species

If diversion of a portion of the spring flow for water supply continues, resulting in the loss or reduction of the associated aquatic and wetland habitat, under Alternative A, long-term, minor, localized, adverse effects on the common black hawk would occur. The common black hawk is known to nest in the project vicinity, and likely uses habitat provided by the Spring 4 pond for foraging. Loss or reduction of habitat in the Spring 4 pond could result in a decrease in habitat for common black hawk prey species in the project area over the long term. If diversion of a portion of the spring flow for water supply continues, resulting in the loss or reduction of the associated aquatic and wetland habitat, under Alternative A, long-term, minor, localized, adverse effects on the common black hawk would occur.

Cumulative Effects

Cumulative impacts to the threatened, endangered, candidate, and sensitive species could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting Big Bend mosquitofish and common black hawk have included park operations, wetland restoration, pond construction, and prescribed fires. Park operations and developments within the RGV developed area are causing habitat contamination, diminished hydrologic flows to wetland/riparian habitat, and other potential threats to the Big Bend mosquitofish and common black hawk habitat. Development of the RGV campground and subsequent increases in visitors and employees to the area have increased human demand for the spring water used by Big Bend mosquitofish. This increasing demand has had and is having an adverse impact on the species and its habitat. Wetland restoration reduced impacts on the Big Bend mosquitofish as well as impacts to common black hawk prey species and habitat, from development inside the wetland, and helped to restore wetland habitat in the area. The low-intensity prescribed burning was conducted to facilitate the restoration of wetland/riparian habitat critical to the Big Bend mosquitofish and common black hawk.

Future projects that could affect threatened, endangered, and sensitive species in the project area include additional pond restoration, campsite relocation, and campground expansion. Pond restoration would improve hydrological and vegetative conditions at several pond sites and allow for additional cottonwood and willow habitat development, which would provide additional habitat for the common black hawk in the project area. A new pond is currently under construction north of the existing Spring 4 pond that will use the Spring 4 water source to supply additional habitat to the Big Bend mosquitofish. Campground relocation would benefit the Big Bend mosquitofish over the long term by reducing habitat contamination and would be consistent with the direction provided in the *Big Bend Gambusia Recovery Plan* for the

species (USFWS 1984). Campground expansion could increase human disturbance in the project area, which may have slight adverse effects on the common black hawk, however, these impacts would be minimized with site-specific mitigation measures for the protection of the species.

Overall, the cumulative effects of past, present, and future projects on threatened, endangered, candidate, and sensitive species would be long-term, localized, minor to moderate, and both beneficial and adverse. Cumulative impacts on threatened, endangered, and sensitive species from Alternative A, in conjunction with these other past, present, and future activities, would be localized, minor to moderate, and both beneficial and adverse over the long term.

Conclusion

Alternative A “may affect, is not likely to adversely affect” the federally endangered Big Bend mosquitofish and its habitat in the park. In addition, if diversion of a portion of the spring flow for water supply continues, resulting in the loss or reduction of the associated aquatic and wetland habitat, under Alternative A, long-term, minor, localized, adverse effects on the common black hawk could occur. Cumulative impacts to threatened, endangered, candidate, and sensitive species from Alternative A; in conjunction with other past, present, and future activities; would be localized, minor to moderate, and both beneficial and adverse over the long term. Therefore, under Alternative A, the determination for this species is “may affect, is not likely to adversely affect.” Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park’s GMP/EIS or other relevant NPS planning document, there would be no impairment of the park’s threatened, endangered, candidate, or sensitive species resources or values under Alternative A.

Impacts of Alternative B

Impact Analysis

Federally Listed Species

The Big Bend mosquitofish is the only federally listed species likely to be affected by Alternative B. Construction activities would have no impacts on the Big Bend mosquitofish within the project area. No construction activities would occur within the ponds occupied by the Big Bend mosquitofish.

In the short term, the Santa Elena well has been extensively pump-tested and monitoring in test wells around Spring 4 showed no effect on the water level of the aquifer around the spring. Over the long term, conversion of the water supply to the Santa Elena well could substantially benefit the Big Bend mosquitofish by accruing the advantages of a greater available water supply. Alternative B would be consistent with the conservation and recovery objectives for the species outlined in the *Big Bend Gambusia Recovery Plan* (USFWS 1984).

Continued monitoring of the effects of the new well’s use on the spring is recommended as well as modification of the use of the well if a decrease in the water levels of the surrounding natural springs was observed. If the NPS determines, upon monitoring, that use of the Santa Elena well is causing a drawdown of water in Spring 4, the NPS would apply adaptive management and consult with the USFWS before taking action under a formal Section 7 consultation process.

The USFWS was consulted about potential impacts to federally listed species. A response received by the park on May 22, 2006, stated that Section 7 consultation could be addressed by the information contained in the EA (Appendix B).

Removal of the chlorinator at the existing springbox at Spring 4 would provide a long-term, localized, moderate, and beneficial effect by reducing the possibility of contaminating surface water or groundwater with chlorine. Impacts from periodic maintenance of existing infrastructure to be used as an emergency back-up system would be similar to that of use of the existing water supply system described under Alternative A. However, adverse impacts would be less because the maintenance would be periodic and use of the existing system would only occur during an emergency.

State-Listed Species

Construction activities would have only short-term, negligible to minor, localized, adverse impacts on the common black hawk in the vicinity of the project area. The project area has been previously affected by years of visitation; any wildlife in the area have likely been long habituated to human activity and noise. The common black hawk would likely avoid the construction area to a certain extent during construction due to increased activity. However, some small animals (potential prey species) may be injured, killed, or forced to relocate to areas outside the construction zone during construction activities. Nest sites are not likely to be affected by construction activities because no woody vegetation suitable for nesting would be removed within the project area.

Removal of the chlorinator at the existing springbox at Spring 4 would provide a long-term, localized, moderate, and beneficial effect by reducing the possibility of contaminating surface water or groundwater. Impacts from periodic maintenance of existing infrastructure to be used as an emergency back-up system would be similar to that of use of the existing water supply system described under Alternative A. However, adverse impacts would be less because the maintenance would be periodic and use of the existing system would only occur during an emergency.

Over the long term, the common black hawk would be beneficially affected by implementation of Alternative B. Conversion of the water supply to the Santa Elena well would not result in the loss or reduction of the associated aquatic and wetland habitat in Spring 4. Maintaining existing habitat in the Spring 4 pond would result in a continued availability of prey species for the common black hawk in the project area over the long term. Overall, localized, minor, beneficial impacts on the common black hawk would be anticipated over the long term.

Cumulative Effects

Cumulative impacts to the threatened, endangered, candidate, and sensitive species could occur from any past, present, and reasonably foreseeable future activities. Past and present projects affecting Big Bend mosquitofish and common black hawk have included park operations, wetland restoration, pond construction, and prescribed fires. Park operations and developments within the RGV developed area are contaminating habitat, diminishing hydrologic flows to wetland/riparian habitat, and causing other potential threats to the Big Bend mosquitofish and common black hawk habitat. Previous development of the RGV campground, and subsequent increases in visitors and employees to the area, has increased human demand for the spring water used by Big Bend mosquitofish. Wetland restoration has reduced impacts on the Big Bend mosquitofish, as well as impacts to common black hawk prey species and habitat. The prescribed burn was conducted to facilitate the restoration of wetland/riparian habitat critical to the Big Bend mosquitofish and common black hawk.

Future projects that could affect threatened, endangered, and sensitive species in the project area include additional pond restoration, campsite relocation, and campground expansion. Pond restoration would improve hydrological and vegetative conditions at several pond sites and allow for additional cottonwood and willow habitat development, which would provide additional habitat for the common black hawk in the project area. A new pond is currently under construction north of the existing Spring 4 pond that will use

the Spring 4 water source to supply additional habitat to the Big Bend mosquitofish. Campground relocation would benefit the Big Bend mosquitofish over the long term by reducing habitat contamination and would be consistent with the direction provided in the *Big Bend Gambusia Recovery Plan* for the species (USFWS 1984). The campground expansion being considered consists of a concession operated recreational vehicle hookup area expansion and is located away from the campground at a site west of the RGV store. This project could increase human disturbance in the vicinity of the project area, which may have slight adverse effects on the common black hawk, however, these impacts would be minimized with site-specific mitigation measures for the protection of the species.

Overall, the cumulative effects of past, present, and future projects on threatened, endangered, candidate, and sensitive species would be long-term, localized, minor to moderate, and both beneficial and adverse. Cumulative impacts on threatened, endangered, and sensitive species from Alternative B, in conjunction with these other past, present, and future activities, would be localized, minor to moderate, and both beneficial and adverse over the long term.

Conclusion

Alternative B would result in long-term beneficial impacts on the Big Bend mosquitofish and its habitat by accruing the advantages of a greater available water supply and reducing the potential for groundwater or surface water contamination with chlorine by removing the chlorinator at the Spring 4 springbox. Alternative B would be consistent with the conservation and recovery objectives for the species outlined in the *Big Bend Gambusia Recovery Plan* (USFWS 1984). Therefore, the determination for this species is “may affect, is not likely to adversely affect.”

Impacts to the Big Bend mosquitofish and the common black hawk from periodic maintenance of existing infrastructure to be used as an emergency back-up system would be similar to those impacts described under Alternative A. However, adverse impacts would be less because the maintenance would be periodic and use of the existing system would only occur during an emergency.

Conversion of the water supply and construction of associated infrastructure is anticipated to result in negligible to minor, localized, adverse impacts on the common black hawk in the short term. Localized, minor, beneficial impacts on the common black hawk would be anticipated over the long term by maintaining existing suitable prey habitat in the Spring 4 pond. Cumulative impacts on threatened, endangered, candidate, and sensitive species from Alternative B; in conjunction with these other past, present, and future activities; would be localized, minor to moderate, and both beneficial and adverse over the long term. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park’s GMP/EIS or other relevant NPS planning document, there would be no impairment of the park’s threatened, endangered, candidate, or sensitive species resources or values under Alternative B.

ARCHEOLOGICAL RESOURCES

Methodology

This impact analysis focuses on archeological resources that could be affected by the project. Information on archeological site potentially present was derived from observations made in the field during site visits on June 28, 2004, January 24, 2006, February 1, 2006, and April 26, 2006; previous cultural resource inventories conducted within the same area; and consultation with park staff. The impact analysis focuses on the potential impacts to archeological resources within or adjacent to the project area that may occur as a result of project implementation.

For purposes of analyzing potential impacts to cultural resources, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be *no adverse effect*.

Minor: *Adverse impact* – disturbance of a site(s) results in little, if any, loss of integrity. The determination of effect for Section 106 would be *no adverse effect*.

Moderate: *Adverse impact* – disturbance of a site(s) results in loss of integrity. The determination of effect for Section 106 would be *adverse effect*. A memorandum of agreement (MOA) is executed among the NPS and state or tribal preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 Code of Federal Regulations (CFR) 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.

Major: *Adverse impact* - disturbance of a site(s) results in loss of integrity. The determination of effect for Section 106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon, and the NPS and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute an MOA in accordance with 36 CFR 800.6(b).

Impacts of Alternative A

Impact Analysis

No alternative water supply with associated facilities would be constructed under this alternative; therefore, Alternative A would result in no impacts to known archeological resources within the project area, and current conditions would remain.

Cumulative Effects

Past and present projects affecting archeological resources have included park operations, wetland restoration, and prescribed burns. Park operations such as wetland restoration and prescribed burns may have minimally affected archeological resources in the area. However, archeological surveys and inventories would have preceded these projects.

Future projects that would affect archeological resources include pond restoration, sewage treatment upgrades, campsite relocation, and campground expansion. Alterations to the RGV campground and visitor services could potentially have long-term, minor to moderate, adverse effects on archeological resources. However, the NPS will plan activities to avoid the loss of archeological resources during implementation of these projects.

Although other past, present, and reasonably foreseeable future actions may affect archeological resources in the area, the no action alternative would have no impacts on archeological resources and therefore would not contribute to the effects of other actions. Consequently, there would be no cumulative impacts to archeological resources under the no action alternative.

Conclusion

Alternative A would result in no impacts to known archeological resources within the project area. Cumulative impacts on archeological resources from Alternative A, in conjunction with other past, present, and future activities, would be minor, localized, and adverse over the short term and localized, minor to moderate, and adverse over the long term. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the

park's GMP/EIS or other relevant NPS planning document, there would be no impairment of the park's archeological resources or values under Alternative A.

Impacts of Alternative B

Impact Analysis

All of the new water pipelines are proposed for placement underneath or adjacent to existing roads or trails to minimize the surface disturbance (Figure 2). Approximately 150 feet of the proposed raw water pipeline would be outside of the road. It would run 3 to 10 feet from the north side of the paved service road before connecting to the existing raw water pipeline. At the existing culverts along this paved road, the disturbance area will expand to 26 feet on the north side of the road. This would result in approximately 0.1 acres of new disturbance. Pipelines would also have to be constructed from the existing water pipelines to the chlorination building, resulting in approximately 0.2 acres of new disturbance (Figure 2).

The proposed chlorination building would result in approximately 0.1 acre of new disturbance. The new power line to the Santa Elena well would only require four new poles and would result in a total disturbance area of less than 0.01 acre.

A new gravel road along an existing trail to the chlorination building, would result in approximately 0.3 acre of new disturbance (Figure 2).

A survey of archeological resources was conducted by the BBNP archeologist within the project area on June 28, 2004; January 24, 2006; February 1, 2006; and April 26, 2006. There are some prehistoric lithic (stone) scatters that would be crossed by the proposed power line and near the proposed chlorination building location. The archeologist has staked these locations, and they will be avoided by construction activities conducted under Alternative B. In addition, the NPS consulted with the Texas Historical Commission regarding the proposed project in a letter dated June 14, 2006. The NPS received a concurrence on July 6, 2006 from the SHPO stating that there would be *no historic properties affected* and that the project may proceed as planned with appropriate monitoring by the park archaeologist (Appendix B).

There would be no impacts to known archeological resources. If, however, significant archeological resources (i.e., those that are eligible to be listed in the NRHP) are discovered during trenching or installation of the four power line poles, all items would be left *in situ* and either the trench would be rerouted or the location of the poles moved to avoid further disturbance. If NRHP eligible or listed archeological resources are discovered during construction of either the chlorination building or new gravel road and those resources could not be avoided, an appropriate mitigation strategy would be developed in consultation with the office of the Texas SHPO and, if necessary, associated American Indian tribes. Any adverse impacts to archeological resources would be long-term or permanent and minor to moderate in intensity.

Cumulative Effects

Past and present projects affecting archeological resources have included park operations, wetland restoration, and prescribed burns. Park operations such as wetland restoration and prescribed burns may have minimally affected archeological resources in the area. However, archeological surveys and inventories would have preceded these projects.

Future projects that would affect archeological resources include pond restoration, sewage treatment upgrades, campsite relocation, and campground expansion. Alterations to the RGV campground and visitor services could potentially have long-term, minor to moderate, adverse effects on archeological resources. However, the NPS will conduct plan activities to avoid the loss of archeological resources during implementation of these projects.

Overall, the cumulative effects of past, present, and foreseeable future projects on archeological resources have been or would potentially be minor, localized, and adverse over the short term and localized, moderate, and adverse over the long term. Cumulative impacts on archeological resources from Alternative B, in conjunction with these other past, present, and future activities, would be minor, localized, and adverse over the short term and localized, minor to moderate, and adverse over the long term. Alternative B would not contribute to cumulative impacts on known archeological resources.

Conclusion

There would be no impacts to known archeological resources because the known sites would be avoided. Any adverse impacts to newly discovered archeological resources would be long-term or permanent and minor to moderate in intensity. Cumulative impacts on archeological resources from Alternative B, in conjunction with other past, present, and future activities, would be minor, localized, and adverse over the short term and localized, minor to moderate, and adverse over the long term. Under Alternative B, the assessment of effect under Section 106 is *no adverse effect*. For Alternative B, the assessment of effect under Section 106 is *no adverse effects*. Because there would be no major adverse impacts to resources or values whose conservation are (1) necessary to fulfill specific purposes identified in the establishing legislation of BBNP, (2) key to the natural or cultural integrity of the park, or (3) identified as a goal in the park's GMP/EIS or other relevant NPS planning document, there would be no impairment of the park's archeological resources or values under Alternative B.

CONSULTATION AND COORDINATION

AGENCIES/ORGANIZATIONS

Agencies and organizations contacted for information; or that assisted in identifying important issues, developing alternatives, or analyzing impacts; or that would review and comment upon the environmental assessment/assessment of effect include:

Federal Agency

U.S. Department of Interior, Fish and Wildlife Service

State Agencies

Texas Commission on Environmental Quality
Texas Historical Commission
Texas Parks and Wildlife Division

Associated American Indians

Apache Tribe of Oklahoma
Blackfeet
Comanche Tribe of Oklahoma
Kickapoo Traditional Tribe of Texas
Kiowa Tribe of Oklahoma
Mescalero Apache Tribe

Preparers

ARCADIS G&M, Inc.

Ron Clemmer, Project Manager
John MacDonald, Task Manager and Senior Biologist
Lucy Bambrey, Document Manager and Senior Cultural Resource Specialist
Jackie Headrick, Senior Scientist
Jie Chen, GIS Mapping and Analysis
Chris Rutledge, Technical Review

Contributors

U.S. Department of Interior, National Park Service

Ken Franc, Denver Service Center, Project Manager
Greg Cody, Denver Service Center, Technical Specialist for Cultural Resources
Paul Wharry, Denver Service Center, Natural Resource Specialist
Vidal Davila, Big Bend National Park, Chief, Division of Science and Resource Management
Raymond Skiles, Big Bend National Park, Wildlife Biologist
Tom Alex, Big Bend National Park, Archeology and Cultural Resources
Jeff Bennett, Big Bend National Park, Physical Scientist/Hydrogeologist
Joe Sirotnak, Big Bend National Park, Botanist/Ecologist

List of Environmental Assessment/Assessment of Effect Recipients

The following agencies, organizations, and groups were sent copies of the Environmental Assessment/ Assessment of Effect:

Federal Agencies

U.S. Department of the Interior, Fish and Wildlife Service

State Agencies

Texas Commission on Environmental Quality
Texas Historical Commission
Texas Parks and Wildlife Division

REFERENCES

- Alex, T. 2006a. Personal communication [April 27 internal scoping meeting discussions with J. MacDonald, ARCADIS G&M, Greenwood Village, Colorado. RE: NRHP eligible sites within the RGV project area]. Archeology and Cultural Resources Specialist, Big Bend National Park.
- Alex, T. 2006b. Assessment of Effect for New System to Treat Drinking water at Rio Grande Village. Big Bend National Park, Texas. May 31, 2006.
- ARCADIS. 2004. Test Well Report. Treat Drinking Water – Rio Grande Village. Big Bend National Park.
- ARCADIS. 2005a. Test Well 3 Report. Treat Drinking Water – Rio Grande Village. Big Bend National Park.
- ARCADIS. 2005b. Schematic Design, Basis of Design Report. Rio Grande Village Water Supply System Replacement. PMIS BIBE-050403.
- Cross B.D. 1984. Application of remote Sensing to the Groundwater Hydrology Study of Big Bend National Park, Texas. Masters Thesis submitted to the Graduate College of Texas A&M University.
- NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life. Version 4.7. NatureServe, Arlington, Virginia [Web Application]. Located at <http://www.natureserve.org/explorer>. Accessed: May 29, 2006.
- Sirotnak, J. 2006. Personal communication [April 27 internal scoping meeting discussions with J. MacDonald, ARCADIS G&M, Greenwood Village, Colorado. RE: Federally listed and sensitive plant species within the RGV project area]. Botanist, Big Bend National Park.
- Skiles, R. 2006. Personal communication [May 22 email to J. MacDonald, ARCADIS G&M, Greenwood Village, Colorado. RE: incorporation of biological assessment in the EA]. Biologist, Big Bend National Park.
- U.S. Department of Agriculture, Natural Resource Conservation Service Soil Survey Division (NRCS). 2006. Official Soil Series Descriptions [Web page]. Located at <http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi>. Accessed: May 24, 2006.
- U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 1984. Recovery Plan for Big Bend Gambusia (*Gambusia gaigei*), 1929. Prepared by the Rio Grande Fishes Recovery Team.
- USFWS. 2006. Federally listed species for Brewster County, Texas [Web Page]. Located at <http://www.fws.gov/ifw2es/EndangeredSpecies/lists/ListSpecies.cfm>. Accessed: May 27, 2006.
- U.S. Department of Interior, National Park Service (NPS). 1998. NPS- 28: Cultural Resource Management Guideline.
- NPS. 2000a. National Park Service Management Policies 2001.
- NPS. 2000b. National Park Service Director's Order #47, Soundscape Preservation and Noise Management.
- NPS. 2001. National Park Service Director's Order #12, Conservation Planning, Environmental Impact Analysis, and Decision-making.

NPS. 2002. National Park Service Director's Order #77-1, Wetland Protection.

NPS. 2004. United States Department of the Interior, National Park Service. Big Bend National Park, Texas. May 2004. Final General Management Plan/Environmental Impact Statement Big Bend National Park.

NPS. 2005. Endangered Big Bend Mosquitofish Habitat Enhancement. Environmental Assessment. Big Bend National Park Texas.

U.S. Environmental Protection Agency (EPA). 1996. Draft Environmental Justice Guidance. July 12, 1996.

U.S. Federal Emergency Management Agency (FEMA). 1985. Flood Insurance Rate Map. Brewster County, Texas, Unincorporated Area. Community Panel Number 480084 1500 B.

Wilson M.P. 1983. Site for a Thermal, Flowing Well at Rio Grande Village, Big Bend National Park, Texas. Department of Geology, Center for Engineering Geosciences, and Center for Remote Sensing. Texas A & M University.

APPENDIX A
PUBLIC SCOPING LETTER, NEWS
RELEASE, AND A LIST OF PERSONS AND
AGENCIES/ORGANIZATIONS TO WHOM
THE SCOPING LETTERS WERE SENT

Page Left Intentionally Blank



United States Department of the Interior
NATIONAL PARK SERVICE
BIG BEND NATIONAL PARK
RIO GRANDE WILD AND SCENIC RIVER
P.O. Box 129
Big Bend National Park, Texas 79834-0129



L7619 (7137)

February 7, 2006

Dear Interested Party:

The National Park Service at Big Bend National Park is seeking comments regarding a proposed project to convert the water supply for the Rio Grande Village developed area from a hot spring to a water supply well. The project would also include construction of a small water treatment structure (one-story, 20-feet by 30-feet); all appurtenant water lines and accessories necessary to connect the new water well to the existing storage and distribution system; a radio-telemetry system for remote monitoring and operation of the water supply system; and fire suppression systems for the maintenance facility and visitor center at Rio Grande Village.

The Rio Grande Village developed area encompasses the park's largest campground and only recreational vehicle campground. The developed area also includes a concessioner-operated campers' store with shower and laundry facilities and an employee housing areas for concessioner and park employees. Use of the well and water treatment structure instead of the hot spring would provide an adequate, reliable, and safe water supply for the Rio Grande Village developed area that meets all state and national drinking water standards.

In addition, implementation of the project would assure an adequate water supply for the endangered Gambusia (mosquito) fish. The existing water source for potable water at Rio Grande Village is a hot spring that also provides water for the Gambusia fish. Continued use of the hot spring for potable water would decrease available flows for this endangered fish species.

Assessment (EA) that will be prepared for this project. The EA should be available for public review during the summer of 2006.

Please submit your written comments online at the NPS Planning, Environment, and Public Comment website at <http://parkplanning.nps.gov/>. An early step in the National Park Service planning process is to involve the public. Park managers, therefore, are soliciting comments on the concerns and issues to be addressed in an Environmental Assessment. The 30 day comment period starts on February 7, 2006 and ends on March 7, 2006. All comments become part of the Administrative Record. Written comments may also be submitted to:

Superintendent
Big Bend National Park
POB 129
Big Bend National Park, TX 79834

Sincerely,

John H. King
Superintendent



National Park Service
U.S. Department of the Interior

Big Bend National Park
P.O. Box 129
Big Bend National Park, TX 79834

FOR IMMEDIATE RELEASE
February 6, 2006

David Elkowitz
432-477-1108

Big Bend National Park News Release

BIG BEND NATIONAL PARK SEEKS COMMENTS ON WATER SUPPLY

Big Bend National Park proposes to convert the water supply for the Rio Grande Village developed area from a hot spring to a water supply well. The project would also include construction of a small water treatment structure (one-story, 20-feet by 30-feet); all appurtenant water lines and accessories necessary to connect the new water well to the existing storage and distribution system; a radio-telemetry system for remote monitoring and operation of the water supply system; and fire suppression systems for the maintenance facility and visitor center at Rio Grande Village.

The Rio Grande Village developed area encompasses the park's largest campground and only recreational vehicle campground. The developed area also includes a concessionaire-operated campers' store with shower and laundry facilities and an employee housing areas for concessionaire and park employees. Use of the well and water treatment structure instead of the hot spring would provide an adequate, reliable, and safe water supply for the Rio Grande Village developed area that meets all state and national drinking water standards.

In addition, implementation of the project would assure an adequate water supply for the endangered Gambusia (mosquito) fish. The existing water source for potable water at Rio Grande Village is a hot spring that also provides water for the Gambusia fish. Continued use of the hot spring for potable water would decrease available flows for this endangered fish species.

An early step in the National Park Service planning process is to involve the public. Park Managers, therefore, are soliciting comments on the concerns and issues to be addressed in an Environmental Assessment (EA) that will be prepared for this project. The EA should be available for public review during the spring of 2006.

Please submit your written comments online at the NPS Planning, Environment, and Public Comment website at <http://parkplanning.nps.gov/>. The 30 day comment period starts on February 7, 2006 and ends on March 7, 2006. All comments become part of the Administrative Record. Written comments may also be submitted to:

Superintendent
Big Bend National Park
POB 129
Big Bend National Park, TX 79834

--END--

EXPERIENCE YOUR AMERICA

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

TABLE A-1 PERSONS AND AGENCIES/ORGANIZATIONS TO WHOM THE SCOPING LETTERS WERE SENT		
Mike Davidson Far Flung Adventures Boxholder Terlingua, TX 79852	Mike Long Desert Sports Boxholder Terlingua, TX 79852	Greg Hennington Texas River Expeditions Boxholder Terlingua, TX 79852
Kenneth Smith HC70, Box 150 Terlingua, TX 79852	Gorden Bell Guadalupe Mountains National Park HC 60, Box 400 Salt Flat, TX 79847-9400	Kevin Urbanczyk Department of Geology Sul Ross State University Alpine, TX 79832
Robert T. Pine U.S. Fish and Wildlife Service Ecological Services Field Office 10711 Burnet Road, Suite 200 Austin, TX 78758	Jack Lamkin, President Friends of Big Bend National Park P.O. Box 342 Marathon, TX 79842	Texas Department of Health 1100 West 49th Street Austin, TX 78756
Texas Water Commission P.O. Box 13087 Austin, TX 78711	Texas Water Development Board P.O. Box 13231 Capital Station Austin, TX 78711-3231	Black Gap Wildlife Management Area Big Bend Route, Box 433 Alpine, TX 79830
Mr. David Allen Bureau of Reclamation 700 San Antonio, Room 318 El Paso, TX 79901	Commissioner International Boundary & Water Comm. The Commons Bldg, Suite 31 4171 North Mesa Street El Paso, TX 79902	Dr. David Bowles Texas Parks and Wildlife Dept. Resource Protection Division 4200 Smith School Road Austin, TX 78744
Mr. James Brooks NM Fishery Resource Office 2105 Osuna NE Albuquerque, NM 87113	Mr. Roy Coffee III Texas Office of State/Federal Regulations 201 East 14th Street, Suite 507 Austin, TX 78701	Mr. Delton Daugherty Texas Parks and Wildlife Dept. Regional Office Fort Davis, TX 79734
Mr. Jack Davis Texas Water Commission P.O. Box 13087 Austin, TX 78711	Dr. David Drummond USDA, Forest Service Box 5500 Pineville, LA 71361	Mr. Tyrus Fain P.O. Box 183 Marathon, TX 79842
Dr. Ralph Garono TNRCC Environmental Assessment Division P.O. Box 13087 Austin, TX 78711-3087	Commissioner Rio Grande Compact Commission P.O. Box 1917 El Paso, TX 79950-1917	Judge S. D. Harrison Terrill County P.O. Drawer 4810 Sanderson, TX 79848
Mr. Jon Hinojosa IV Texas Office of State/Federal Regulations 201 East 14th Street, Suite 507 Austin, TX 78701	Ms. Margaret Honer Texas Parks and Wildlife Dept. Endangered Resources Branch 3000 South HI 35, Suite 100 Austin, TX 78704	Mr. Buddy Jensen US Fish and Wildlife Service Dexter National Fish Hatchery P.O. Box 219 Dexter, NM 88230
Mr. Roy Kleinsasser Texas Parks and Wildlife Dept. Division of Resource Protection 4200 Smith School Road Austin, TX 78744	Mr. Tom Palmer Regional Office Texas Parks and Wildlife Fort Davis, TX 79734	Ms. Susan Anderson The Nature Conservancy Mexico Program 300 East University, Suite 230 Tucson, AZ 85705
Mr. David Brown Texas Nature Conservancy P.O. Box 1440 San Antonio, TX 78295	Ms. Liz Ecker Desert Botanical Garden 1201 North Galvin Parkway Phoenix, AZ 85008	Mr. David Foster American Cave Conserv. Assoc. P.O. Box 409 Horse Cave, KY 42749

TABLE A-1 PERSONS AND AGENCIES/ORGANIZATIONS TO WHOM THE SCOPING LETTERS WERE SENT		
Ms. Maurie Haas Audubon Society Frontera Chapter P.O. Box 8124 Weslaco, TX 78596	Ms. Wendy Hodgson Herbarium Curator, Research Desert Botanical Garden 1201 North Galvin Parkway Phoenix, AZ 85008	Mr. John Karges P.O. Box 2078 Fort Davis, TX 79736
Mr. Henry Little The Conservation Fund 1800 North Kent Street, Suite 11 Arlington, VA 22209	Mr. Roy Powers Route 1, Box 153 Duffield, VA 24244	Mr. Brian Sybert Sierra Club, Lone Star Chapter P.O. Box 1931 Austin, TX 78767
Ms. Janes Walker Big Bend Astronomical Society Double Diamond Ranch HC65, Box 14 Alpine, TX 79830	Ms. Jackie Poole Division of Resource Protection Texas Parks and Wildlife Dept. 4200 Smith School Road Austin, TX 78744	Dr. Andrew Price Texas Parks and Wildlife Dept. Division of Resource Protection 4200 Smith School Road Austin, TX 78744
Regional Administrator U.S. E.P.A. 1445 Ross Avenue Dallas, TX 75202	Mr. David Riskind Resource Management Division Texas Parks and Wildlife Dept. 4200 Smith School Road Austin, TX 78744	Mr. Darren Rudloff Tourism Division 17001 North Congress P.O. Box 12728 Austin, TX 78711-2728
Ms. Patty Manning Sul Ross State University Dept of Biology Alpine, Texas 79830	Luis Armendariz Park Manager Texas Parks & Wildlife Big Bend Ranch State Park P.O. Box 2319 Presidio, Texas 79845	Mr. F. Lawrence Oaks, Executive Director State Historical Preservation Officer Texas Historical Commission P.O. Box 12276 Austin, TX 78711
Ms. Debra Little International Boundary Water Commission United States Section 4171 North Mesa, Suite C310 El Paso, TX 79902	Ms. Jean Weaver Office of International Geology Department of the Interior, USGS 917 National Center Reston, VA 22092	Fran Sage Big Bend Regional Sierra Club P.O. Box 564 Alpine, TX 79831
Amy Sugeno Resource Management Division Texas Parks and Wildlife Dept. 4200 Smith School Road Austin, TX 78744	The Wilderness Society 1615 M St., N.W. Washington, DC 20006	Henry Bonilla 2458 Rayburn House Office Building Washington, DC 20515
Henry Bonilla 11120 Wurzbach, Suite 300 San Antonio, TX 78230-2428	Kay Bailey Hutchison 282 Russell Senate Office Building Washington, DC 20510-4304	Kay Bailey Hutchison 145 Duncan Drive, Suite 120 San Antonio, TX 78226-1898
Val Beard Brewster County Judge P.O. Drawer 1630 Alpine, TX 79831	Walt Dabney Parks Division Director Texas Parks & Wildlife Dept 4200 Smith School Road Austin, TX 78744-3292	Susan Combs, Commissioner Texas Dept of Agriculture P.O. Box 12847 Austin, TX 78711
Alpine Chamber of Commerce 106 N. 3 rd Street Alpine, TX 79830	Big Bend Chamber of Commerce P.O. Box 607 Terlingua, TX 79852	Marfa Chamber of Commerce P.O. Box 635 Marfa, TX 79843
Marathon Chamber of Commerce P.O. Box 163 Marathon, TX 79842	Presidio Chamber of Commerce P.O. Box 1405 Presidio, TX 79845	Fort Stockton Chamber of Commerce 222 W. Dickinson Fort Stockton, TX 79735

TABLE A-1 PERSONS AND AGENCIES/ORGANIZATIONS TO WHOM THE SCOPING LETTERS WERE SENT		
Governor Rick Perry Office of the Governor P.O. Box 12428 Austin, TX 78711-2428	Sierra Club Houston Regional Group POB 3021 Houston, TX 77253-3021	Brandt Mannchen Conservation Committee Houston Sierra Club 5431 Carew Houston, TX 77096

This page left intentionally blank.

APPENDIX B

AGENCY COMMENT LETTERS

Page Left Intentionally Blank

From: Raymond_Skiles@nps.gov
Sent: Monday, May 22, 2006 1:04 PM
To: MacDonald, John
Subject: Fw: Rio Grande Village Water Project

Here's the FWS reply re. B.A.

Raymond Skiles
PO Box 129
Big Bend National Park, TX 79834
Ph: 432/477-1145, fax 1153, raymond_skiles@nps.gov

----- Forwarded by Raymond Skiles/BIBE/NPS on 05/22/2006 02:03 PM -----

Nathan_Allan@fws.
gov

05/15/2006 02:20
PM EST

To: raymond_skiles@nps.gov
CC:
Subject: Rio Grande Village Water Project

Hey Raymond,

Just wanted to let you know I did get your fax with the "Dear Interested Party" letter dated Feb. 7, 2006 (not sure why I didn't receive the mailing?).

As we talked about on the phone, I think you should be able to incorporate the information for a biological assessment within your EA to facilitate Section 7 consultation - at whatever level you determine is appropriate.

My apologies for the delay and glad to see you guys continuing to make progress on this project.

Hopefully I'll see you at a RGSM meeting again sometime. Later, Nathan

Nathan Allan
U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, Texas 78758
v: 512/490-0057 x237 fax: 512/490-0974
nathan_allan@fws.gov



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE

Big Bend National Park
Rio Grande Wild and Scenic River
P.O. Box 129
Big Bend National Park, Texas 79834-0129

H2215 (BIBE-ScRM)

June 14, 2006

Ms. Debra Beene
Division of Archeology
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

RECEIVED

JUN 16 2006

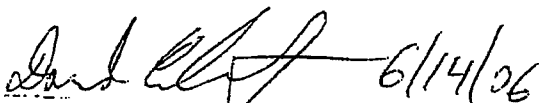
Texas Historical Commission

Dear Ms. Beene:

Enclosed is a Section 106 archeological clearance report entitled *Assessment of Effect for New System to Treat Drinking Water at Rio Grande Village*, for your review. This report is submitted according to Section 106 of the National Historic Preservation Act.

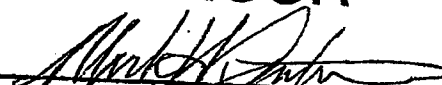
This action is consistent with Cultural Resource Management Guidelines, NPS-28 and Secretary of Interior Standards, and is considered to be of NO ADVERSE EFFECT. We seek your expedient review and concurrence so that the project can proceed. If you have any further questions regarding this project, please telephone Archeologist Tom Alex at (432) 477-1144.

Sincerely,



David Elkowitz
Acting Superintendent

Enclosure

CONCUR *	
by 	
for F. Lawrence Oaks	
State Historic Preservation Officer	
Date	

* MONITOR BY PARK ARCHEOLOGIST

Kathleen Hartnett White, *Chairman*
R. E. "Ralph" Marquez, *Commissioner*
Larry R. Soward, *Commissioner*
Glenn Shankle, *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

March 31, 2006

Mr. John H. King
Superintendent
Big Bend National Park
P. O. Box 129
Big Bend National Park, TX 79834-0129

Re: TCEQ Grant and Environmental Assessment Review System (GEARS) #7104, U. S. Department of the Interior, Big Bend National Park - Rio Grande Village Water System Improvements

Dear Mr. King:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers following comments:

A review of the project for General Conformity impact in accordance with 40 CFR Part 93 and Title 30, Texas Administrative Code § 101.30 indicates that the proposed action is located in Brewster County, which is currently unclassified or in attainment of the National Ambient Air Quality Standards for all six criteria air pollutants. Therefore, general conformity does not apply.

Although any demolition, construction, rehabilitation or repair project will produce dust and particulate emissions, these actions should pose no significant impact upon air quality standards. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques.

We recommend the environmental assessment address actions that will be taken to prevent surface and groundwater contamination.

It has been determined from a review of the information provided that an Application for TCEQ Approval of Floodplain Development Project need not be filed with TCEQ. Our records show that the community is a participant in the National Flood Insurance Program and as such has a Flood Hazard Prevention Ordinance / Court Order. Accordingly, care should be taken to ensure that the proposed construction takes into account the possible Flood Hazard Areas within the community's floodplains. Please notify the community floodplain administrator to ensure that all construction is in compliance with the community's Flood Hazard Prevention Ordinance / Court Order.

Mr. John H. King

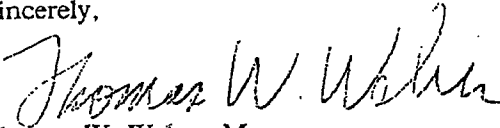
Page 2

March 31, 2006

Re: TCEQ Grant and Environmental Assessment Review System (GEARS) #7104, U. S. Department of the Interior, Big Bend National Park - Rio Grande Village Water System Improvements

Thank you for the opportunity to review this project. If you have any questions, please call Ms. Betty Thompson at (512) 239-1627.

Sincerely,

A handwritten signature in cursive script, reading "Thomas W. Weber".

Thomas W. Weber, Manager

Water Programs

Texas Commission on Environmental Quality

March 30, 2006

Mr. John King, Superintendent
Big Bend National Park
PO Box 129
Big Bend National Park, Texas 79834

Dear Mr. King:

This letter is in response to your review request, dated February 7, 2006, for concerns on rare, threatened, and endangered species as a consequence of the proposed water treatment plant (WTP) and conversion of the park water source from hot spring to well water at Big Bend National Park in Brewster County.

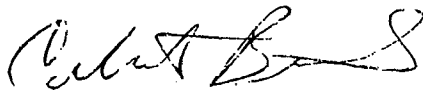
TPWD recommends the environmental assessment clearly identify:

- location of the new WTP
- source of ground water and potential for impacts to the spring water source (hydrogeologic connectivity)
- area to be disturbed by the construction of the WTP and distribution pipes
- assessment of the potential presence for rare plants and animals in the project area and the mitigation measures that will be followed to avoid impacts to them

TPWD has previously provided input during recovery team meetings for the Big Bend gambusia. However, TPWD would appreciate receiving a copy of the draft environmental assessment when it becomes available for review.

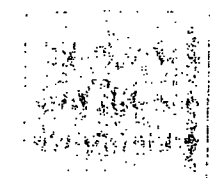
A current TPWD county list of rare species potentially occurring in Brewster County is included for your planning reference. Please contact me if you have any questions or need additional assistance (512/912-7021).

Sincerely,



Celeste Brancel, Environmental Review Coordinator
Wildlife Habitat Assessment Program, Wildlife Division
Threatened and Endangered Species

Enclosure



COMMITTEE

JOHN B. C. FLETCHER
CHAIRMAN
SAN ANTONIO

ALVIN L. HENRY
VICE CHAIRMAN
HOUSTON

J. RICHARD BROWN
EL PASO

T. DAN FRIEDMAN
HOUSTON

NED S. HOLMES
HOUSTON

PETER M. HOLT
SAN ANTONIO

PHILIP MONTGOMERY
DALLAS

JOHN D. PARKER
LUFKIN

DONALD D. RAMOS
LANE

L. M. BASK
CHAIRMAN-EMERITUS
FORT WORTH

ROBERT L. COCK
EXECUTIVE DIRECTOR



Take a kid
hunting or fishing

Visit a state park
or historic site

BREWSTER COUNTY

Federal
Status

State
Status

*** BIRDS ***

American Peregrine Falcon (<i>Falco peregrinus anatum</i>) - resident in west Texas	DL	E
Arctic Peregrine Falcon (<i>Falco peregrinus tundrius</i>) - potential migrant	DL	T
Baird's Sparrow (<i>Ammodramus bairdii</i>) - shortgrass prairie with scattered low bushes and matted vegetation		
Black-capped Vireo (<i>Vireo atricapilla</i>) - oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	LE	E
Common Black Hawk (<i>Buteogallus anthracinus</i>) - cottonwood-lined rivers and streams; willow tree groves on the lower Rio Grande floodplain; formerly bred in Texas		T
Gray Hawk (<i>Asturina nitida</i>) - locally and irregularly along U.S.-Mexico border; mature riparian woodlands and nearby semiarid mesquite and scrub grasslands; breeding range formerly extended north to southernmost Rio Grande floodplain of Texas		T
Interior Least Tern (<i>Sterna antillarum athalassos</i>) - this subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish & crustaceans, when breeding forages within a few hundred feet of colony	LE	E
Montezuma Quail (<i>Cyrtonyx montezumae</i>) - open pine-oak or juniper-oak with ground cover of bunch grass on flats and slopes of semi-desert mountains and hills; travels in pairs or small groups; eats succulents, acorns, nuts, and weed seeds, as well as various invertebrates		
Mountain Plover (<i>Charadrius montanus</i>) - shortgrass plains and plowed fields (bare, dirt fields); primarily insectivorous		
Northern Aplomado Falcon (<i>Falco femoralis septentrionalis</i>) - open country, especially savanna and open woodland, and sometimes in very barren areas; grassy plains and valleys with scattered mesquite, yucca, and cactus; nests in old stick nests of other bird species	LE	E
Southwestern Willow Flycatcher (<i>Empidonax traillii extimus</i>) - thickets of willow, cottonwood, mesquite, and other species along desert streams	LE	E
Western Burrowing Owl (<i>Athene cunicularia hypugaea</i>) - open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows and man-made structures, such as culverts		
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>) - status applies only west beyond the Pecos River Drainage; breeds in riparian habitat and associated drainages; springs, developed wells, and earthen ponds supporting mesic vegetation; deciduous woodlands with cottonwoods and willows; dense understory foliage is important for nest site selection; nests in willow, mesquite, cottonwood, and hackberry; forages in similar riparian woodlands; breeding season mid-May-late Sept	Cl	
Zone-tailed Hawk (<i>Buteo albonotatus</i>) - arid open country, including open deciduous or pine-oak woodland, mesa or mountain country, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites, ranging from small trees in lower desert, giant cottonwoods in riparian areas, to mature conifers in high mountain regions		T

*** FISHES ***

Big Bend Gambusia (<i>Gambusia gaigei</i>) - presently restricted to one artificial springfed pool in Big Bend National Park close to the Rio Grande; type locality described as a marshy cattail slough fed by springs	LE	E
---	----	---

Texas Parks & Wildlife
Annotated County Lists of Rare Species
BREWSTER COUNTY, cont'd

Last Revision: 6 Oct 2005
Page 2 of 9

	Federal Status	State Status
Bluntnose Shiner (<i>Notropis simus</i>) (extirpated) - main river channels, often below obstructions over substrate of sand, gravel, and silt; damming and irrigation practices presumed major factors contributing to decline		T
Blue Sucker (<i>Cypleptus elongatus</i>) - larger portions of major rivers in Texas; usually inhabits channels and flowing pools with a moderate current; bottom type usually consists of exposed bedrock, perhaps in combination with hard clay, sand, and gravel; adults winter in deep pools and move upstream in spring to spawn on riffles		T
Chihuahua Shiner (<i>Notropis chihuahua</i>) - clear, cool water that is often associated with nearby springs; often in pools with slight current or riffles over a gravel or sand bottom where vegetation may be present		T
Conchos Pupfish (<i>Cyprinodon eximius</i>) - Rio Grande and Devils River basins; sloughs, backwaters, and margins of larger streams, channels of creeks, and mouths		T
Headwater Catfish (<i>Ictalurus lupus</i>) - originally throughout streams of the Edwards Plateau and the Rio Grande basin, currently limited to Rio Grande drainage, including Pecos River basin; springs, and sandy and rocky riffles, runs, and pools of clear creeks and small rivers		
Maravillas red shiner (<i>Cyprinella lutrensis blairi</i>) (extinct) - found in Maravillas Creek, reported extinct in 1989		
Mexican Stoneroller (<i>Campostoma ornatum</i>) - in Texas, Big Bend region; clear, fast riffles, chutes, and pools in small to medium-sized creeks with gravel or sand bottoms		T
Rio Grande Shiner (<i>Notropis jemezianus</i>) - large, open, weedless rivers or large creeks with bottom of rubble, gravel and sand, often overlain with silt		
Rio Grande Silvery Minnow (<i>Hybognathus amarus</i>) (extirpated) - historically Rio Grande and Pecos River systems and canals; pools and backwaters of medium to large streams with low or moderate gradient in mud, sand, or gravel bottom; ingests mud and bottom ooze for algae and other organic matter; probably spawns on silt substrates of quiet coves.	LE	E
West Mexican Redhorse (<i>Scartomyzon austrinus</i>) - known only from Alamito Creek, Big Bend region; restricted to rocky riffles of creeks and small to medium rivers, often near boulders in swift water		

*** INSECTS ***

- Blanchards' Sphinx Moth (*Amphypterus blanchardi*)** - unknown, but may be confined to the deciduous forest in Upper Green Gulch to Panther Pass summit of Big Bend National Park; host plant undetermined; May-June adult emergence
- Bonita Diving Beetle (*Deronectes neomexicana*)** - predatory, feeding on other water insects and insect larvae; spend majority of life underwater, surfacing only to create an air bubble held under the wing covers for breathing

*** MAMMALS ***

- Big Free-tailed Bat (*Nyctinomops macrotis*)** - habitat data sparse but records indicate that species prefers to roost in crevices and cracks in high canyon walls, but will use buildings, as well; reproduction data sparse, gives birth to single offspring late June-early July; females gather in nursery colonies; winter habits undetermined, but may hibernate in the Trans-Pecos; opportunistic insectivore
- Black-tailed Prairie Dog (*Cynomys ludovicianus*)** - dry, flat, shortgrass grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups
- Black Bear (*Ursus americanus*)** - within historical range of Louisiana Black Bear in eastern Texas, Black Bear is federally listed threatened and inhabits bottomland hardwoods and large tracts of undeveloped forested areas; in remainder of Texas, Black Bear is not federally listed and inhabits desert lowlands and high elevation forests and woodlands; dens in tree hollows, rock piles, cliff overhangs, caves, or under brush piles

T/SA;
NL

T

Texas Parks & Wildlife
Annotated County Lists of Rare Species
BREWSTER COUNTY, cont'd

Last Revision: 6 Oct 2005
Page 3 of 9

Federal State
Status Status

- Cave Myotis Bat** (*Myotis velifer*) - roosts colonially in caves, rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Petrochelidon pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum caves of Panhandle during winter; opportunistic insectivore
- Davis Mountains Cottontail** (*Sylvilagus floridanus robustus*) - brushy pastures, brushy edges of cultivated fields, and well-drained streamsides; active mostly at twilight and at night, where they may forage in a variety of habitats, including open pastures, meadows, or even lawns; rest during daytime in thickets or in underground burrows and small culverts; feed on grasses, forbs, twigs and bark; not sociable and seldom seen feeding together
- Desert Bighorn Sheep** (*Ovis canadensis mexicana*) - rough, rocky mountainous terrain; bluffs and steep slopes with sparse vegetation
- Fringed Bat** (*Myotis thysanodes*) - habitat variable, ranging from mountainous pine, oak, and pinyon-juniper to desert-scrub, but prefers grasslands at intermediate elevations; highly migratory species that arrives in Trans-Pecos by May to form nursery colonies; single offspring born June-July; roosts colonially in caves, mine tunnels, rock crevices, and old buildings
- Ghost-faced Bat** (*Mormoops megalophylla*) - colonially roosts in caves, crevices, abandoned mines, and buildings; insectivorous; breeds late winter-early spring; single offspring born per year
- Gray Wolf** (*Canis lupus*) (extirpated) - formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands
- Greater Long-nosed Bat** (*Leptonycteris nivalis*) - in Texas, Big Bend region; colonial, cave-dwelling species that usually inhabits deep caverns; nectivorous, with *Agave* spp. preferred; breeding season April-June, with single offspring born in Mexico prior to migration to Texas
- Greater Western Mastiff Bat** (*Eumops perotis californicus*) - diurnal roosts in rock crevices of vertical cliffs; colony size varies from several individuals to several dozen; males and females may remain together throughout the year; single offspring (occasionally twins) born June-July
- Limpia Creek Pocket Gopher** (*Thomomys bottae texensis*) - throughout Davis Mountains; habitat variable, ranging from lower canyons to higher coniferous woodlands; loose sands and silts to tight clays; dry deserts to montane meadows; active year round, mostly underground; diet variable, but mostly roots and tubers; breeds continuously, but main season in spring
- Limpia Southern Pocket Gopher** (*Thomomys bottae limpiae*) - Limpia Canyon area of Davis Mountains; habitat variable, ranging from loose sands and silts to tight clays; active year round, mostly underground; diet variable, but mostly roots and tubers; breeds continuously, but main season in spring
- Long-legged Bat** (*Myotis volans*) - in Texas, Trans-Pecos region; high, open woods and mountainous terrain; nursery colonies (which may contain several hundred individuals) form in summer in buildings, crevices, and hollow trees; apparently do not use caves as day roosts, but may use such sites at night; single offspring born June-July
- Ocelot** (*Leopardus pardalis*) - dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas; breeds and raises young June-November
- Pale Townsend's Big-eared Bat** (*Corynorhinus townsendii pallescens*) - roosts in caves, abandoned mine tunnels, and occasionally old buildings; hibernates in groups during winter; in summer months, males and females separate into solitary roosts and maternity colonies, respectively; single offspring born May-June; opportunistic insectivore
- Pocketed free-tailed bat** (*Nyctinomops femorosaccus*) - semiarid desert grasslands; roosts in caves cliff crevices under building roof tiles; feed on insects; females bear one pup per season Jul - Aug
- Spotted Bat** (*Euderma maculatum*) - in Texas, Big Bend region; preferred habitat not fully understood, but species reported from pine forests at high elevations to open, desert scrub; reproduction data sparse, but single offspring born June-July

LE E

LE E

LE E

T

Texas Parks & Wildlife
Annotated County Lists of Rare Species
BRE WSTER COUNTY, cont'd

Last Revision: 6 Oct 2005
Page 4 of 9

Federal State
Status Status

Western Small-footed Bat (*Myotis ciliolabrum*) - mountainous regions of the Trans-Pecos, usually in wooded areas, also found in grassland and desert scrub habitats; roosts beneath slabs of rock, behind loose tree bark, and in buildings; maternity colonies often small and located in abandoned houses, barns, and other similar structures; apparently occurs in Texas only during spring and summer months; insectivorous

Western Yellow Bat (*Lasiurus xanthinus*) - forages over water both perennial and intermittent sources, found at low elevations (<6,000 feet), roosts in vegetation (yucca, hackberry, sycamore, cypress, and especially palm); also hibernates in palm; locally common in residential areas landscaped with palms in Tuscon and Phoenix, Arizona; young born in June; insectivore

White-nosed Coati (*Nasua narica*) - woodlands, riparian corridors and canyons; most individuals in Texas probably transients from Mexico; diurnal and crepuscular; very sociable; forages on ground and in trees; omnivorous

T

Yellow-nosed Cotton Rat (*Sigmodon ochrognathus*) - higher elevations in the Chisos Mountains, Davis Mountains, and Sierra Vieja; rocky slopes with scattered bunches of grass; underground dens and aboveground nests in various locations, including at base of agaves or roots of junipers; active in daytime; several litters possible during breeding season of March-October

Yuma Myotis Bat (*Myotis yumanensis*) - desert regions; most commonly found in lowland habitats near open water, where forages; roosts in caves, abandoned mine tunnels, and buildings; single offspring born May-early July

MOLLUSKS

Chisos Mountains Threeband (*Humboldtiana chisosensis*) - known from the Chisos Mountains, Big Bend National Park; in xeric rockslides along the lower margin of the evergreen woodland

False Spike Mussel (*Quincuncina mitchelli*) - substrates of cobble and mud, with water lilies present; Rio Grande, Brazos, Colorado, and Guadalupe (historic) river basins

Salina Mucket (*Potamilus metneckayi*) - lotic waters; other habitat requirements are poorly understood; Rio Grande Basin

Stockton Plateau Threeband (*Humboldtiana texana*) - rocky hill country with short grasses and some dwarf oaks on the hills; elevation about 1200-1500 m (3900-5000 ft)

Texas Hornshell (*Popenaias popeii*) - both ends of narrow shallow runs over bedrock, in areas where small-grained materials collect in crevices, along river banks, and at the base of boulders; not known from impoundments; Rio Grande Basin and several rivers in Mexico

C

*** REPTILES ***

Trans-Pecos Black-headed Snake (*Tantilla cucullata*) - small size with a uniform body color and a small, dark head; secretive; fossorial; mostly nocturnal; mesquite-creosote and pinyon-juniper-oak; eggs laid June-August; eat insects, spiders, and other invertebrates

T

Big Bend Slider (*Trachemys gaigeae*) - almost exclusively aquatic, sliders (*Trachemys* spp.) prefer quiet bodies of fresh water with muddy bottoms and abundant aquatic vegetation, which is their main food source; will bask on logs, rocks or banks of water bodies; breeding March-July

Chihuahuan Desert Lyre Snake (*Trimorphodon wilkinsonii*) - mostly crevice-dwelling in predominantly limestone-surfaced desert northwest of the Rio Grande from Big Bend to the Franklin Mountains, especially in areas with jumbled boulders and rock faults/fissures; secretive; egg-bearing; eats mostly lizards

T

Chihuahuan Mud Turtle (*Kinosternon hirtipes murrayi*) - semi-aquatic, prefers bodies of fresh water with abundant aquatic vegetation; eats invertebrates; breeds March-July

T

Reticulated Gecko (*Coleonyx reticulatus*) - rocky desert areas of the Big Bend region; terrestrial and nocturnal; reproduction not well known, but captive individuals laid eggs in July

T

Texas Parks & Wildlife
Annotated County Lists of Rare Species
BRE WSTER COUNTY, cont'd

Last Revision: 6 Oct 2005
Page 5 of 9

Federal Status	State Status
	T

Texas Horned Lizard (*Phrynosoma cornutum*) - open, arid and semi-arid regions with sparse vegetation, which could include grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

*** VASCULAR PLANTS ***

Appressed two-bristle rock-daisy (*Perityle bisetosa* var. *appressa*) - crevices in limestone exposures on bluffs and other rock outcrops; flowering late summer-fall

Big Bend hop-hornbeam (*Ostrya chisosensis*) - mixed woodlands on mesic rocky igneous slopes at high elevations in the Chisos Mountains; flowering May-June

Bigpod bonamia (*Bonamia ovalifolia*) - alluvial sand among boulders on rocky lower slopes in canyons of the Rio Grande; flowering (May-) July-November

Boquillas lizardtail (*Gaura boquillensis*) - mostly in sandy soils in desert canyons and arroyos, occasionally in gravelly limestone soils in Chihuahuan Desert scrub at low elevations; flowering March-August

Brush-pea (*Genistidium dumosum*) - Chihuahuan Desert scrub on rocky limestone hills at lower elevations; flowering June-September

Bunched cory cactus (*Coryphantha ramillosa* ssp. *ramillosa*) - rocky slopes, ledges, and flats in the Chihuahuan Desert, most frequently on exposures of Santa Elena Limestone or the Boquillas Formation between about 750-1050 m (2500-3500 ft) elevation; flowering (April?) July-August

LT T

Bushy wild-buckwheat (*Eriogonum suffruticosum*) - sparsely vegetated rocky limestone slopes, low hills, and clay flats; flowering March-April; in full fruit by May

Chaffey's cory cactus (*Escobaria dasyacantha* var. *chaffeyi*) - evergreen woodlands on rocky limestone soils at about 1750-2150 m (5800-7000 ft.); flowering April-May; fruiting June-September

Chisos agave (*Agave glomeruliflora*) - grasslands or oak-juniper woodlands at elevations of about 1050-1850 m (3500-6000 ft); flowering July-August

Chisos coral-root (*Hexalectris revoluta*) - humus in oak groves along rocky creekbeds at higher elevation. in the Glass Mountains, it has been found "among lechuguilla and shinnery oak on the sunny slopes and ridges"; flowering June-July, sometimes in May when spring rains are abundant

Chisos Mountains hedgehog cactus (*Echinocereus chisoensis* var. *chisoensis*) - desert grasslands or open shrublands on unconsolidated gravelly fan and terrace deposits on desert flats and low hills at moderate elevations of about 600-750 m (2000-2500 ft) in the Chihuahuan Desert; flowering March-early June, or April-July; fruit maturing May-August

LT T

Chisos oak (*Quercus graciliformis*) - oak woodlands in dry rocky canyons, usually associated with a high water table; in moister portions of canyons of the Chisos Mountains, above about 1650 m (5400 ft) elevation; fruiting July-early September

Chisos pinweed (*Lechea mensalis*) - open pine-oak woodlands over igneous rock outcrops at high elevations in mountains of the Trans Pecos; presumably flowering June-August

Cliff bedstraw (*Galium correllii*) - dry, steep or vertical limestone cliff faces of various exposures in Chihuahuan Desert along Rio Grande and tributaries, at elevations between about 450-500 m (1500-1650 ft); flowering April-November; fruiting May-December

Correll's green pitaya (*Echinocereus viridiflorus* var. *correllii*) - among grasses on rock crevices on low hills in desert or semi-desert grassland, occasionally on novaculite

Cox's dalea (*Dalea bartonii*) - semi-desert shortgrass grasslands with scattered pinyon pine and juniper in gravelly soils on limestone hills; the one known location reportedly lies at an altitude of about 1100 m (3600 ft); probably flowering in June, fruiting in July

Cutler's twistflower (*Streptanthus cutleri*) - open shrublands or grasslands on calcareous gravel of talus slopes, rocky hillsides and gravelly stream beds, at moderate elevations in the Chihuahuan Desert; flowering mostly February-March, sometimes into May

Texas Parks & Wildlife
Annotated County Lists of Rare Species
BREWSTER COUNTY, cont'd

Last Revision: 6 Oct 2005
Page 6 of 9

Federal Status	State Status
LE	E

- Davis' green pitaya (*Echinocereus viridiflorus* var. *davisii*) - novaculite outcrops in full sun among sparse Chihuahuan Desert scrub usually hidden in mats of *Selaginella*; flowering late March-April
- Desert night-blooming cereus (*Peniocereus greggii* var. *greggii*) - shrublands in lower elevation desert flats and washes; visually similar to dead stems of woody plants; flowering concentrated during a few nights in late May-late June
- Duncan's cory cactus (*Escobaria dasyacantha* var. *duncanii*) - Chihuahuan Desert scrub on low to moderate elevation hills, ledges, and benches; in Texas on outcrops of Boquillas Formation limestone; flowering mid April to early May; fruits mature late May-early June
- Durango yellow-crest (*Rorippa ramosa*) - moist, fine textured, alluvial soils on floodplains and in beds of intermittent streams; flowering March-May
- Dwarf broomspurge (*Chamaesyce jejuna*) - endemic; according to specimen collections, found in grama-grass prairie on caliche uplands, dry caliche slopes, and limestone hills; flowering late March-late July
- Glass Mountains rock-daisy (*Perityle vitreomontana*) - crevices in limestone exposures on cliffs and rock outcrops in the Glass Mountains; flowering June-October
- Golden-spine hedgehog cactus (*Echinocereus chloranthus* var. *neocapillus*) - sparsely vegetated desert grasslands over novaculite outcrops
- Golden-spine prickly-pear (*Opuntia aureispina*) - desert flats on slabs and fractured Boquillas Limestone, Chihuahuan Desert near Rio Grande, at about 600 m (1900 ft) elevation
- Green spikemoss (*Selaginella viridissima*) - shaded or sheltered igneous rock ledges and cliffs in the Chisos and Davis mountains; spore bearing June-August
- Guadalupe Mountains fescue (*Festuca ligulata*) - woodlands and grasslands on mesic slopes and in creekbottoms above 6000 feet in the Guadalupe and Chisos mountains; substrates in the Chisos Mountains are gravelly and sandy loams derived from igneous materials; substrate in the Guadalupe Mountains unknown but presumed to be loamy soils over limestone; flowering August-September
- Havard's stonecrop (*Sedum havardii*) - crevices in igneous rock outcrops, sometimes loose igneous talus, in oak-pinyon woodlands and chaparral at medium to high elevations in the Chisos and Davis mountains; flowering June-September
- Heather leaf-flower (*Phyllanthus ericoides*) - crevices in limestone on dry canyon walls and other rock outcrops; flowering in October, and presumably other months, given sufficient moisture
- Hester's cory cactus (*Escobaria hesteri*) - grasslands on dry gravelly limestone hills and alluvial fans at about 1200-1500 m (4000-5000 ft); often on novaculite; flowering May-early June; fruiting June-July
- Hinckley's brickellbush (*Brickellia hinckleyi* var. *hinckleyi*) - mixed woodlands or forests on rocky slopes in higher-elevation mountain canyons; most specimens are from canyons on the north flank of Mt. Livermore in the Davis Mountains, where substrates are igneous; flowering July-October
- Hinckley's oak (*Quercus hinckleyi*) - arid limestone slopes at mid elevations in Chihuahuan Desert; produces acorns late August to early September
- Jackie's bluet (*Stenaria mullerae* var. *pooleana*) - north- to east-facing vertical limestone cliff faces in mid-elevation canyons in mountains in the Chihuahuan Desert, known locations lie at elevations between about 1450-1500 m (4,800-4,900 ft); flowering May, perhaps to September
- Kay's grama (*Bouteloua kayi*) - gravelly soils on desert flats and on limestone ledges along bluffs; flowering May-November
- Lateleaf oak (*Quercus tardifolia*) - mixed evergreen-deciduous woodlands in moist canyon bottoms at about 2150 m (7000 ft) elevation in the Chisos Mountains
- Leatherweed croton (*Croton pottsii* var. *thermophilus*) - sparingly vegetated desert grasslands on extremely xeric sites at low elevations of about 500-800 m (1650-2600 ft), on substrates ranging from sand to limestone and basalt; flowering spring-fall

Cl

LT T

Texas Parks & Wildlife
Annotated County Lists of Rare Species
BRE WSTER COUNTY, cont'd

Last Revision: 6 Oct 2005
Page 7 of 9

	Federal Status	State Status
Leoncita false foxglove (<i>Agalinis calycina</i>) - grasslands on moist heavy alkaline/saline calcareous silty clays and loams in and around cienegas (desert springs); flowering September-October		
Little-leaf brongniartia (<i>Brongniartia minutifolia</i>) - Chihuahuan Desert shrublands at lower elevations of about 750 (2500 ft), in blackish sand, gravel, volcanic ash and other substrates, often in or along arroyos or shallow drainages; flowering June-August		
Lloyd's mariposa cactus (<i>Sclerocactus mariposensis</i>) - among low shrubs and rosette-forming perennials in gravelly soils on arid limestone slopes in the Chihuahuan Desert, mostly on Boquillas Formation; elevation 750-1050 m (2500-3500 ft); flowering February-early March	LT	T
Longstalk heimia (<i>Nesaea longipes</i>) - moist or subirrigated alkaline or gypsiferous clayey soils along unshaded margins of cienegas and other desert wetlands; including somewhat saline silt loams on terraces of spring-fed streams in a grassland; also in moderately alkaline clay along perennial streams and subirrigated wetlands atop poorly-defined spring system; flowering May-September		
Many-flowered unicorn-plant (<i>Proboscidea spicata</i>) - dry sandy alluvial and/or eolian soils on terraces along Rio Grande; also in disturbed sandy soils at scattered sites along roadsides elsewhere in the Trans Pecos; flowering May-June (-August)		
Maravillas milkwort (<i>Polygala maravillasensis</i>) - crevices of limestone exposed on canyon walls, mostly along the Rio Grande and its tributaries, in low desert mountains at about 450-950 m (1500-3100 ft) elevation; flowering May-October		
Mary's bluet (<i>Stenaria butterwickiae</i>) - shallow pockets or crevices in limestone bedrock on ridgetops; flowering or fruiting at least May-August		
Murray's plum (<i>Prunus murrayana</i>) - deciduous woodlands on steep rocky slopes in mesic, high elevation mountain canyons on both igneous and sedimentary substrates; flowering March-April; fruiting June-August		
Nellie's cory cactus (<i>Escobaria minima</i>) - novaculite outcrops in full sun among Chihuahuan Desert scrub; flowering March-June, fruiting June-October	LE	E
Old blue pennyroyal (<i>Hedeoma pilosum</i>) - open exposed limestone		
Orcutt's senna (<i>Senna orcuttii</i>) - gravelly soil on limestone slopes and in beds of intermittent streams, within various mid- to lower-elevation Chihuahuan Desert communities; flowering July-August		
Pale phacelia (<i>Phacelia pallida</i>) - Chihuahuan Desert scrub on gypsum or limestone soils at low elevations; flowering May-early August		
Perennial caltrop (<i>Kallstroemia perennans</i>) - barren gypseous clays or limestone soils at low elevations in the Chihuahuan Desert; flowering late spring-early fall		
Purple gay-mallow (<i>Batesimalva violacea</i>) - among boulders in moist igneous rock canyons, often under small trees and large shrubs; habitat in Mexico dry deciduous forest and brushy field, thickets; flowering/fruiting October-November in Big Bend National Park; possibly throughout the year in Mexico		
Ripley's senna (<i>Senna ripleyana</i>) - gravelly hilltops in arid grasslands and creosote flats in Chihuahuan Desert; apparently at elevations of 1200-1500 m (4000-5000 ft); flowering/fruiting July-October		
Robust oak (<i>Quercus robusta</i>) - deciduous; mesic drainages within the Chihuahuan Desert; can reach about 5 to 10 m tall (15-35 ft)		
Shinner's tickle-tongue (<i>Zanthoxylum parvum</i>) - understory of maple-oak woodlands or evergreen oak shinnery on rocky, well drained, neutral, non-calcareous loams underlain by rhyolite, tuff or other igneous rock, at elevations between about 1400-1750 m (4500-5700 ft); flowering late March-early April		
Sierra del Carmen oak (<i>Quercus carmenensis</i>) - moist wooded canyon bottoms in the Chisos Mountains at about 4200 feet (1500 m) elevation; flowering spring		
Silver cholla (<i>Opuntia imbricata</i> var. <i>argentea</i>) - deep soils of mesquite thickets and creosote flats on desert bottomlands and washes; rocky limestone soil; flowering June-July; fruiting September-October		

Texas Parks & Wildlife
Annotated County Lists of Rare Species
BREWSTER COUNTY, cont'd

Last Revision: 6 Oct 2005
Page 8 of 9

Federal	State
Status	Status

- Slimlobe rock-daisy** (*Perityle dissecta*) - perennial; walls of limestone canyons in desert regions; only rock-daisy in west Texas with finely dissected hairy leaves; flowering/fruiting spring-fall
- Stairstep two-bristle rock-daisy** (*Perityle bisetosa* var. *scalaris*) - crevices in limestone exposures on bluffs and other rock outcrops; flowering late summer-fall
- Straw-spine glory-of-Texas** (*Thelocactus bicolor* var. *flavidispinus*) - gravel hills in desert grasslands or shrublands below about 450 m (1400 ft); in the Marathon Basin of Brewster County; apparently restricted to soils derived from Caballos Novaculite; flowering in May
- Swallow spurge** (*Chamaesyce golondrina*) - alluvial or eolian sand along Rio Grande, occasionally on adjacent shale or limestone slopes; flowering June-November
- Terlingua brickellbush** (*Brickellia hinckleyi* var. *terlinguensis*) - various situations in Chihuahuan Desert; slopes in the Chisos Mountains; also along creek bottoms; flowering July-October?
- Terlingua Creek cat's-eye** (*Cryptantha crassipes*) - community of sparse vegetation that develops on low, seemingly barren, xeric hills of gypseous clay and chalky shales of the Boquillas Formation; flowering late March-early June; fruiting April-July
- Texas false saltgrass** (*Allolepis texana*) - sandy to silty soils of valley bottoms and river floodplains; flowering (June-) July-October
- Texas largeseed bittercress** (*Cardamine macrocarpa* var. *texana*) - seasonally (hibernally or vernal) moist loamy soils in pine-oak woodlands at high elevations in the Chisos Mountains; also moderate elevations in pinyon-oak-juniper woodlands in Kinney and Uvalde counties; flowering early spring, sometimes persisting (or flowering again?) through August
- Texas milkvine** (*Matelea texensis*) - desert grasslands or shrublands over igneous substrate, at elevations of about 1200-1500 m (4000-5000 ft)
- Texas wolf-berry** (*Lycium texanum*) - semi-desert grasslands and thorn shrublands on sandy, gravelly, and/or loamy soils, on very gently sloping terrain as well as in rocky areas in canyons, often over limestone at moderate elevations; flowering March-October
- Three-tongue spurge** (*Chamaesyce chaetocalyx* var. *triligulata*) - steep limestone cliffs and adjacent colluvium, mostly in Chihuahuan Desert; flowering July-October
- Trans-Pecos maidenbush** (*Andrachne arida*) - crevices in calcareous bedrock exposures on arid mountain slopes, usually with succulents, Texas sites are on Cretaceous limestone; flowering July-October
- Two-bristle rock-daisy** (*Perityle bisetosa* var. *bisetosa*) - crevices in limestone exposures on bluffs and other rock outcrops; flowering late summer-fall
- Warnock's coral-root** (*Hexalectris warnockii*) - leaf litter and humus in oak-pinyon-juniper woodlands in the Trans Pecos, primarily on igneous substrates in higher mesic canyons (up to about 2000 m (6500 ft.)), but at lower elevations to the east, often on narrow terraces along creekbeds; flowering June-August.
- Watson's false clappia-bush** (*Pseudoclappia watsonii*) - Chihuahuan Desert shrublands on dry, rocky, gypseous clay hills; flowering May-August
- Wendt's malaxis** (*Malaxis wendtii*) - in Texas only from oak-juniper-pinyon woodlands in moist canyons and on north-facing slopes in the Chisos Mountains; flowering July-September
- White column cactus** (*Escobaria albicolumnaria*) - creosote, lechuguilla, or canyon shrublands primarily on nearly level terrain to rolling hills on thin, gravelly soils or limestone bedrock of the Santa Elena, Glen Rose, Boquillas, and Telephone Canyon formations; at lower elevations (ca. 2000-4500 feet) in the Chihuahuan Desert; flowering early March-May
- Wilkinson's whitlow-wort** (*Paronychia wilkinsonii*) - shallow rocky soils in crevices on novaculite hills or outcrops at low to moderate elevations in the Chihuahuan Desert; flowering April-October
- Wright's trumpets** (*Acleisanthes wrightii*) - open semi-desert grasslands and shrublands on shallow stony soils over limestone on low hills and flats; flowering spring-fall, probably after rains, also

LE	E
----	---

Texas Parks & Wildlife
Annotated County Lists of Rare Species
BREWSTER COUNTY, cont'd

Last Revision: 6 Oct 2005
Page 9 of 9

Federal	State
Status	Status

Wright's water-willow (*Justicia wrightii*) - shortgrass grasslands and/or shrublands, dry gravelly clay soils over limestone on flats and low hills at elevations of 900-1500 m (3000-5000 ft); flowering April-July

Status Key:

- LE,LT - Federally Listed Endangered/Threatened
- PE,PT - Federally Proposed Endangered/Threatened
- E/SA,T/SA - Federally Endangered/Threatened by Similarity of Appearance
- CI - Federal Candidate, Category 1; information supports proposing to list as endangered/threatened
- DL,PDL - Federally Delisted/Proposed for Delisting
- NL - Not Federally Listed
- E,T - State Listed Endangered/Threatened
- "blank" - Rare, but with no regulatory listing status

Species appearing on these lists do not all share the same probability of occurrence. Some species are migrants or wintering residents only, or may be historic or considered extirpated.



Notes for
County Lists of Texas' Special Species



The Texas Parks and Wildlife (TPWD) county lists **include**:

Vertebrates, Invertebrates, and Vascular Plants on the special species lists of the TPWD, Non-game and Rare Species Program, Natural Diversity Database (NDD) (formerly the Biological and Conservation Data System). These special species lists are comprised of all species, subspecies, and varieties that are federally listed; proposed to be federally listed; have federal candidate status; are state listed; or carry a global conservation status indicating a species is imperiled, very rare, vulnerable to extirpation; and some species ranked rare or uncommon.

Colonial Waterbird Nesting Areas and Migratory Songbird Fallout Areas are included on the county lists for coastal counties only.

The TPWD county lists **exclude**:

Natural Plant Communities such as Little Bluestem-Indiangrass Series (native prairie remnant), Water Oak-Willow Oak Series (bottomland hardwood community), Saltgrass-Cordgrass Series (salt or brackish marsh), Sphagnum-Beakrush Series (seepage bog).

Other Significant Features such as non-coastal bird rookeries, comprehensive migratory bird information, bat roosts, bat caves, invertebrate caves, and prairie dog towns.

These lists are not all inclusive for all rare species distributions. The lists were developed and are updated based on field guides, NDD occurrences data, staff expertise, and scientific publications. In order to keep the lists to a reasonable length, historic ranges for some state extirpated species, full historic distributions for some extant species, accidentals and irregularly appearing species, and portions of migratory routes for particular species are not included.

The **revised date** on each county list reflects the last date any changes or revisions were made for that county and reflects current listing statuses and taxonomy.

Species that appear on county lists do not all share the same probability of occurrence within a county. Some species are migrants or wintering residents only. Additionally, a few species may be historic or considered extirpated within a county. Species considered extirpated within the state are so flagged on each list.

This information is for your assistance only; due to continuing data updates, **please do not reprint or redistribute the information, instead refer all requesters to our office to obtain the most current information available.**



The Natural Diversity Database



The Texas Parks and Wildlife Department (TPWD), Natural Diversity Database (NDD) (formerly the Biological and Conservation Data System), established in 1983, is the Department's most comprehensive source of information on rare, threatened, and endangered plants and animals, exemplary natural communities, and other significant features. Though it is not all-inclusive, the NDD is constantly updated, providing current or additional information on statewide status and locations of these unique elements of natural diversity.

The NDD gathers biological information from museum and herbarium collection records, peer reviewed publications, experts in the scientific community, organizations, qualified individuals, and on-site field surveys conducted by TPWD staff on public lands or private lands with written permission. TPWD staff botanists, zoologists, and ecologists perform field surveys to locate and verify specific occurrences of high-priority biological elements and collect accurate information on their condition, quality, and management needs.

The NDD can be used to help evaluate the environmental impacts of routing and siting options for development projects. It also assists in impact assessment, environmental review, and permit review.

Given the small proportion of public versus private land in Texas, the NDD does not include a representative inventory of rare resources in the state. Although it is based on the best data publicly available to TPWD regarding rare species, these data cannot provide a definitive statement as to the presence, absence, or condition of special species, natural communities, or other significant features in any area. Nor can these data substitute for on-site evaluation by qualified biologists. The NDD information is intended to assist the user in avoiding harm to species that may occur.

Please use the following citation to credit the source for this county level information:

Texas Parks and Wildlife Department, Wildlife Division, Non-game and Rare Species and Habitat Assessment programs. County Lists of Texas' Special Species. [county name(s) and revised date(s)].

For information on obtaining a project review form or a site-specific review of a project area for rare species, and for updated county lists, please call (512) 912-7011.



As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

National Park Service
U.S. Department of Interior

